THE IRON TRADE REVIEW

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Heavy Increase of Orders Not Expected

As Result of Reduction in Prices—Lowering of Wages Discussed at New York Meeting—Few Bar Contracts Made

Manufacturers do not expect any marked improvement in business as a result of recent reductions in prices of finished materials. They are not willing to grant, however, that there will be further reductions which, in plates, shapes and bars, are confidently expected by buyers. Some of the companies are very conservative about making contracts. The Carnegie Steel Co. especially is emphatic in its instructions to agents that contracts must be made cautiously and with the distinct understanding that they will be adhered to. Immediately preceding the announcement of the reduction in bar prices, the Republic Iron & Steel Co. booked considerable business guaranteed against decline, but little business has been done since the announcement was made, and specifications are not coming in. The American Bridge Co. bookings for May were somewhat better than normal, but fabricating and erecting prices are extremely low. At the lengthy meeting of steel manufacturers in New York, Monday, a considerable part of the time was devoted to discussion of labor conditions with a view to possible reduction of wages to conform to lower prices for finished materials. The Steel Corporation took a firm stand against wage reductions.

Rails

The outlook for the placing of rail orders by western companies is more favorable, and some orders of good size are expected soon. In export trade, the United States Steel Products Co. has taken 8,000 tons of 60-pound rails for the New South Wales government, and 4,000 for bridge work for Japan. Considerable bridge and building work for export is pending. The Mexican steel business situation cleared up considerably during the past week.

Structural Material

Some contracts, held up since the reduction in bars was announced, will probably be placed at the new quotation of 1.35c, Pittsburg, but in many cases, there will be postponement of orders, owing to the expectation of further reductions. Structural material was as low as 1.20c in the spring of 1909, and buyers believe that 1.35c cannot now be maintained. Among the contracts of the week were: The Mallers building, Chicago, 4,000 tons, to the Hansell-Elcock Co. and the South Halsted Iron Works; the Thirty-third street pier, Brooklyn, 1,600 tons; the Armour Fertilizer building, Chrome, N. Y., 1,100 tons; and the power house of the Bush terminal, Brooklyn, 1,000 tons, to the American Bridge Co., which will probably also furnish the steel for the Riggs hotel and theater, Washington, for which Wells Bros. have the contract. The Y. M. C. A. building, Cleveland, 1,500 tons, is among those held up, awaiting further developments.

Pig Iron

Events in the finished material market have had a tendency to further limit the very moderate tonnage of pig iron sales changing hands. There has been some additional selling of Virginia iron, but the leading Virginia producer has not yet disposed of the 25,000 tons it had hoped to sell. Eastern Pennsylvania makers have been compelled to cut their prices 25 cents a ton. Some Buffalo makers are selling as low as $13.25, furnace, for No. 2X. In the south, $10.50 for No. 2 Birmingham is the ordinary quotation for third quarter, and $10.25 has been named in a limited number of cases. Further weakness has developed in the malleable iron market in the Pittsburg district.

Cast Iron Pipe

The United States Cast Iron Pipe & Foundry Co. has been awarded 2,750 tons by the city of Boston; 3,000 tons by St. Louis, 1,200 tons by LaCrosse, Wis., and 400 tons by Bay City, Mich. There is sharp competition on both public and private work.

Sheets and Plates

The new quotations on sheets show a reduction of $4 a ton in the price of black and galvanized sheets, and $2 a ton in the price of blue annealed sheets, as compared with so-called official prices, but many of the smaller companies have been cutting regular prices from $1.50 to $2 per ton. The new prices are lower than have prevailed for ten years on black and galvanized. However, there is some consolation for the independents in the reduction of prices of sheet bars $2 a ton. The reduction of $1 per ton in plates brings the market to the prices which have been named for some weeks by a few independent concerns. Further reductions in plates are expected by buyers.

Bars

The action of the Republic Iron & Steel Co., in reducing quotations on steel bars $3 a ton, has not been followed by heavy contracting, as agricultural implement makers and other large consumers have not forgotten that large tonnages were sold two years ago at 1.10c, Pittsburg, or $3 below the recently made price. Some consumers have expressed a willingness to contract, but expect to be protected in the event of further declines in prices. Some companies are offering to contract up to July 1, 1912, but others are more conservative.

WORLD'S IRON MARKETS

PITTSBURG

Heavy Cut in Sheets Causes Comment—Awaiting Further Developments.

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., May 30.

The general reduction in prices of from $1 to $4 a ton on steel bars, plates, shapes, billets, sheet bars and black, galvanized and blue annealed sheets, effective June 1, following the action of the Republic Iron & Steel Co. in cutting the price of steel bars $3 a ton on May 24, was not unexpected, although several prominent manufacturers were strongly opposed to a general reduction at this time. The action on the part of the manufacturers in cutting prices on plates and shapes $1 a ton and billets and sheet bars $2 a ton, while black and galvanized sheets were cut $4 a ton, has caused considerable comment. The heavy cut in the price of sheets is regarded by some as a declaration of war against the smaller sheet manufacturers who have been making concessions even on small, unattractive orders, when the larger mills were endeavoring to maintain prices. On account of today being a holiday, it is difficult to determine what effect the general cut in prices has had or will have on the local situation. However, investigation shows that there is more business in all lines appearing than a month ago, and buyers are well pleased with the new turn of affairs. Executive and sales offices of many of the steel companies are not observing the holiday, and the first business day following the revision of prices promises some interesting developments. With the exception of steel bars, it is not believed that any large tonnages have been booked at the lower prices and in the case of steel bars, most of the tonnage on the books at present was placed on Wednesday, Thursday and Friday of last week. Since that time, farm implement manufacturers have been playing a waiting game, as they are not convinced that 1.25c, Pittsburg, on steel bars is the absolute minimum. No announcement has been made regarding prices on rails, wire products and tin plate, but some announcement regarding these branches is expected within a day or so. Since May 24, when the Republic company announced the cut on steel bars, a smaller volume of business has been placed than in any single week in a long time, and there has been a heavy falling off in specifications. On account of the unsettled condition of the market and the holiday, many of the mills were closed Saturday and will not resume operations until tomorrow morning (Wednesday).

Pig Iron.—The general tone of the pig iron market is weak. The low prices quoted on some grades have not brought out very much tonnage, as consumers are covered for early needs, and are giving little attention to future requirements. Shipments against contracts show no material decline and there has been no important change in the number of active furnaces. One or two merchant blast furnaces are scheduled to go in within the next week or 10 days, and some of the merchant furnaces which were scheduled to go out of blast the latter part of this month likely will continue in blast indefinitely. No. 4 Haselton blast furnace of the Republic Iron & Steel Co., has been completed, and will be blown in in the near future. Some of the furnaces of the Jones & Laughlin Steel Co. at Aliquippa, Pa., will be blown in early in June. Additional odd lots of basic pig iron have been sold in this market on a basis of $13.10, valley, but the iron will not come from valley furnaces. The general asking price of the valley furnace interests is $13.25, valley. Further weakness has developed in the malleable pig iron market, and extremely low quotations have been made on this grade for prompt and forward delivery. There is moderately heavy inquiry for eastern shipment, but very little of this business will come to local furnaces. The market is quotable at from $13.25 to $13.35, valley. There are also scattered inquiries for foundry pig iron, but this market as a whole is not showing much life, as consumers are showing little interest in third quarter iron, although stocks are very low. Some furnaces continue to ask $14, valley, for No. 2 foundry, but this price is known to have been shaded. Demand for Bessemer is light and no important sales have been made. The market on gray forge iron is weak. We quote the market as follows:

(Prompt Shipment.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.10
Basic, Pittsburg	14.00
No. 2 foundry, Pittsburg	14.65
Gray forge, Pittsburg	13.90
Malleable, Pittsburg	14.15

(Third Quarter.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.25
Basic, Pittsburg	14.15
No. 2 foundry, Pittsburg	14.65
Gray forge, Pittsburg	13.90
Malleable, Pittsburg	14.15

Ferro-Alloys.—A Southern Ohio interest has closed for 300 tons of ferro-manganese for shipment during June, July and August on a basis of $36.50, Baltimore. A local consumer has taken a carload at $37, Baltimore. Scattered sales of the lower grades of ferro-silicon for eastern shipment at full prices are noted. Demand for 50 per cent ferro-silicon is light.

We quote ferro-manganese at $36.50 to $37, Baltimore, for prompt and forward delivery. The freight rate from Baltimore to Pittsburg is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $52.75 to $53.75, Pittsburg, for prompt and forward delivery; 12 per cent, $25; 11 per cent, $24; 10 per cent, $23, f. o. b. Jisco and Ashland furnaces. The freight rate to Pittsburg is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—Comparatively little business in plates was placed during the week on account of the uncertainty as to what would be done in the way of prices, and consumers who have long term contracts specified only for their actual needs. The reduction of $1 a ton announced Monday evening simply brings the market level down to the quotations made by several mills all through May. There is a fair amount of business pending and plate manufacturers believe that new bookings in June will exceed those of April and May and be equal to those of March. The awarding of the contract for the 4,500 tons of plates to be used in the Los Angeles, Cal., aqueduct has been postponed until June 9. This business likely will come to a local mill. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.35c. Extras are as follows, per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½ inch to and including 3-16 inch plate on thin edge, 0.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—The reduction of $4 a ton in the price of black and galvanized sheets and $2 a ton in the price of blue annealed sheets came as a distinct surprise to the local trade, although some mills had been shading prices $2 a ton on the small amount of business appearing during the early part of May. The new quotation on blue annealed sheets is really a reduction of $3 a ton as compared with prices quoted on May 1, as prices were reduced $1 a ton several days ago to meet competition on the part of plate manufacturers. The statement issued in New York on Monday does not refer to painted and galvanized roofing sheets and as there is a fair amount of business in roofing sheets appearing, it is expected that prices on this grade of sheets will be established in the very near future. In January, 1910, black sheets No. 28 gage were quoted at 2.40c, Pittsburg, and galvanized were quoted at 3.50c, Pittsburg. In April, 1910, prices on both grades were reduced $1 a ton and a similar cut was made in May. The following month, there was another cut of $1 a ton and the market was unchanged until November, when there was further shading. Following a meeting in December, 1910, the market was established at 2.20c and 3.20c, Pittsburg, respectively, in black and galvanized sheets and these were regarded as the official prices, although there has been considerable shading during the past two months. Practically all sheet mills have been idle since Saturday on account of the holiday. We quote prices as follows, with $1 a ton added as the delivered price in the Pittsburg district:

Blue annealed sheets, No. 10 gage, 1.50c; box annealed sheets, No. 28 gage, 2c; galvanized sheets, No. 28 gage, 3c; painted roofing sheets, 1.50c to 1.55c per square for No. 28 gage, 2½-inch corugation; galvanized roofing sheets, 2.75c per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—The market is very quiet as far as new business is concerned. Specifications are fairly liberal and local mills expect to make heavy shipments in June and July. So far there has been little, if any, shading of the $3.70, Pittsburg, quotation on 14 x 20 100-pound cokes. We quote the market as follows:

Coke tin plate, 10-pound basis, 14 x 20, $3.70 f. o. b. mill, Pittsburg district.

Rails and Track Material.—Some of the larger railroads which bought heavy tonnages early in the year are expected to enter the market in June for moderately heavy tonnage of steel rails for delivery over the last half of the year. Practically all roads are now accepting shipments of rails and track supplies against contracts made some months ago. In some quarters it was believed that the price of steel rails would be cut, but local manufacturers say that this question has never been considered seriously. So far there has been no general reduction in the price of railroad spikes and scattered sales are reported this week on a basis of $1.60, Pittsburg. Demand for light rails is only moderate and slight concessions have been made on small tonnages where there was keen competition. We quote the market as follows, the base price on open-hearth rails being 1.34c per pound at the mill.

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.16c, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; track bolts, 2.25c, Pittsburg.

RAILROAD SPIKES.

4½, 5 and 5½ x ⅜	$1.60
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x ⅞	.20
3, 3½, 4 and 4½ x ⅝	.30
2½ x ⅝	.40
2½, 3 and 3½ x ⅝	.60
2 x ⅝	.80

Steel—The reduction of $2 a ton in the price of billets and sheet bars was not unexpected, as there had been considerable irregularity in the open-hearth steel market for several weeks. There is more business in semi-finished steel appearing and orders entered on mill books during the first 24 days of May showed a healthy gain over the corresponding period in April. Since the Republic Iron & Steel Co. announced a cut in the price of bars on Wednesday of last week new business in semi-finished steel has been light and there has been a noticeable falling off in specifications. Extremely low quotations on both Bessemer and open-hearth billets and sheet bars were quoted early in December, 1910. About the close of the year all mills began quoting $23 on Bessemer and open-hearth billets and $24 on Bessemer and open-hearth sheet bars, Pittsburg or Youngstown, with full freight to destination added. These prices were maintained on Bessemer steel, but had been shaded $1 a ton on open-hearth steel. We quote the market as follows:

Bssemer 4 x 4 billets with 0.25 carbon and less are quoted at $21, with the usual extras for size and analysis, and open-hearth rolling billets, $21. Bessemer sheet and tin bars are quoted at $22, and open-hearth sheet bars are quoted at $22, f. o. b. Pittsburg or Youngstown, with full freight to destination added. Forging billets are quoted at $28, Pittsburg.

Hoops and Bands.—Purchases are being confined to cover actual needs and users of hoops and bands are giving little attention to last half requirements. We quote the market nominally as follows:

Hoops in carload lots, 1.45c, Pittsburg; in less than carload lots, 1.55c; bands, 1.25c base, with net extras, as per standard steel.

Merchant Bars.—All manufacturers of steel bars are now quoting 1.25c, Pittsburg, on steel bars for prompt and forward shipment, following the cut of $3 a ton on May 24, by the Republic Iron & Steel Co. While some companies are quoting this price only for shipment over the next four months, others are quoting 1.25c, Pittsburg, to jobbers until Oct. 1; to general consumers until Jan. 1, 1912, and to agricultural implement makers until July 1, 1912. While the action of the Republic Iron & Steel Co. in cutting bars came as a surprise to the trade in general, it was known on Tuesday of last week that the company had booked several large orders for delivery up to July, 1912, and, while few details as to the price situation had leaked out, it was known that buyers were to be protected in case of decline and they had knowledge that prices would be reduced. Notwithstanding reports to the contrary, it is known that heavy tonnages of steel bars have been booked. In addition, farm implement manufacturers are negotiating for exceedingly heavy tonnage of bars and some large awards are expected as soon as users are convinced that 1.25c, Pittsburg, is the absolute minimum. The average monthly price of steel bars in January, 1910, was 1.49c, Pittsburg. For the following six months the average price was 1.45c, Pittsburg. This price was cut $1 a ton in August, 1910, and the 1.40c, Pittsburg, quotation, applied from that time until May 24, when the Republic company made a cut of $3 a ton. There is little activity in the bar iron market and we quote the market nominally at 1.30c, Pittsburg. We quote the market as follows:

Common iron bars, 1.30c, Pittsburg; Bes-

semer and open-hearth steel bars, 1.25c; plow and cultivator, 1.25c; channels, angles, zees, tees, under 3-inch, 1.35c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Structural.—There is a large amount of proposed new structural work under active negotiation in this territory, but on account of the unsettled condition of the steel market during the past week, no important awards have been made. Now that the price question has been settled for the present at least, steel makers and fabricators expect some fairly large structural awards during the next 30 days. Bids on the 9,000 tons of steel for the proposed new Point bridge, Pittsburg, will be asked during the coming month. Work of razing the present buildings at Smithfield street and Sixth avenue, Pittsburg, where the new Oliver hotel building will be erected, likely will be started in June. A contract for the new buildings to be erected at Midland, Pa., by the Pittsburg Crucible Steel Co., involving about 6,000 tons of steel, likely will be awarded within a few weeks. We quote the market as follows:

Beams and channels, 15 inches and under, 1.35c; over 15 inches, 1.45c; zees, 1.35c; tees, 1.40c; angles, from 3 to 6 inches, 1.35c; over 6 inches, 1.45c; universal and sheared plates, 6¼ inches wide and wider, 1.35c.

Merchant Pipe.—Heavy tonnage of pipe has been booked this month and the mills are running on a more satisfactory schedule. There is a large volume of business in line pipe pending, including 30 miles of 12-inch steel pipe for West Virginia shipment and similar tonnage for Western Pennsylvania and Ohio shipment later in the year. In addition to the awards noted a few weeks ago, the leading interest has taken orders for 22 miles of 8-inch steel pipe for western shipment and a local independent mill has taken an order for 10 miles of 6-inch steel pipe for shipment to Canada. While no official statement has been made regarding prices on merchant iron and steel pipe, the local trade does not look for a cut, as there was a general reduction in prices on Oct. 1, 1910, and present prices are regarded as being extremely low. We quote the following official discounts in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified, being offered in from ⅛ to 6 inches:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Butt weld.			
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch.....	72	58	68	54
½ inch	75	63	71	59
¾ to 1¼ inch.....	79	69	75	65
2 to 3 inches	80	70	76	66

		Lap weld.		
2 inches	76	66	72	62
2½ to 4 inches	78	68	74	64
4½ to 6 inches.....	77	67	73	63
7 to 12 inches.....	75	59	71	55

EXTRA STRONG, PLAIN ENDS.

		Butt weld.		
⅛, ¼, ⅜ inch	69	59	65	55
½ inch	74	68	70	64
¾ to 1¼ inch	78	72	74	68
2 to 3 inches.....	79	73	75	69

EXTRA STRONG, PLAIN ENDS.

		Lap weld.		
2 inches	75	69	71	65
2½ to 4 inches.....	77	71	73	67
4½ to 6 inches.....	76	70	72	66
7 to 8 inches.....	69	59	65	55
9 to 12 inches.....	64	54	60	50

DOUBLE EXTRA STRONG, PLAIN ENDS.

		Butt weld.		
½ inch	64	58	60	54
¾ to 1½ inch.....	67	61	63	57
2 to 3 inches	69	63	65	59

DOUBLE EXTRA STRONG, PLAIN ENDS.

		Lap weld.		
2 inches	65	59	61	55
2½ to 4 inches.....	67	61	63	57
4½ to 6 inches.....	66	60	62	56
7 to 8 inches.....	59	49	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

Boiler Tubes.—Little has been accomplished so far in placing contracts for boiler tubes for delivery over the remainder of the year, beginning July 1. Specifications are light and shipments during the past week show a decline. We quote the following discounts on steel boiler tubes in carload lots to jobbers:

1¾ to 2¼ inch	65
2½ inch	67½
2¾ to 3¼ inch	70
3½ to 4½ inch	72½
5 and 6 inch	65
7 to 13 inch	62½

To destination east of the Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg. Usual extras to jobbers and boiler manufacturers.

Wire Products.—Specifications for wire and wire nails during the past 10 days have been moderately heavy on account of the action on the part of manufacturers in advising jobbers and other buyers that all low price contracts made some time ago would be terminated June 30. This action was taken prior to the cut in steel bars announced last week and an official statement regarding the wire market has not been issued since the meeting of steel manufacturers in New York on Monday. New business in May has been extremely light, although mill operations have not been seriously affected. It is likely that some announcement regarding the wire market will be made within a few days. Demand for cut nails is light and the market is now quotable at $1.60, Pittsburg, although a few mills are still asking $1.65, Pittsburg. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85; cut nails (western makers), jobbers' carload lots, $1.60 to $1.65; cut nails (eastern makers), Pittsburg base, $1.70; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.90, with 30c for galvanizing; plain wire to jobbers in carloads, $1.60, and to dealers, in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.10.

Wire Rods.—Most users of wire rods are covered by contract and there is little trading in the open market. Small lots for early shipment have been sold at slightly under the openly quoted prices and we quote $28.50 to $29, Pittsburg, on Bessemer and open-hearth wire rods.

Coke.—The coke market continues extremely quiet and in some quarters further evidence of weakness has appeared. Shipments are not as heavy as at the beginning of the month and production is gradually being cut down. In a few instances, furnace interests are negotiating for June requirements and consumers are quietly sounding the market with a view of covering for last half, but so far no important sales have been made for this period. While some of the principal sellers continue to quote $1.50, ovens, on furnace coke for prompt shipment, sales have been made at considerably under this figure and good coke can be had at $1.40, ovens. So far, a definite price has not been established for third quarter and last half, the general asking price being $1.80, ovens. Demand for foundry coke for prompt shipment is light and some low prices have been made. We quote standard Connellsville furnace coke for prompt shipment at from $1.40 to $1.50, ovens, and for second half nominally at $1.80, ovens. On high-grade Connellsville foundry coke, we quote from $1.75 to $2, ovens, for prompt shipment, and from $2.15 to $2.40, ovens, for delivery over the remainder of the year. The Connellsville *Courier's* figures for the week ending May 20 show 24,332 active ovens with an output of 273,108 tons, as compared with 24,612 active ovens and a production of 278,037 tons the previous week.

Old Material.—While the scrap market has been rather quiet during the week as far as sales are concerned, consumers are showing a disposition to cover for their forward requirements and the outlook is more promising. Both producers and dealers are more conservative and are not inclined to dispose of their holdings at low prices, while in several instances consumers have endeavored to cover for their full requirements over the next few months at low prices. Heavy melting steel can still be had at $13, delivered, Pittsburg, although all dealers will not quote this price. Sales of this grade during the past week have been confined to lots of from 300 to 500 tons. Demand for bundled sheet scrap is improving, although no large tonnages have changed hands in this territory. Scattered sales of No. 1 cast scrap, machine shop turnings and old iron rails have been made at full prices. We quote, gross tons,

delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee as follows:

Heavy melting scrap	$13.00 to 13.25
Rerolling rails	14.00 to 14.25
Bundled sheet scrap	10.50 to 10.75
Iron axles	23.50 to 24.00
Old iron rails	15.50 to 16.00
No. 1 wrought scrap	13.50 to 14.00
Old car wheels	13.00 to 13.50
Low phosphorus	16.50 to 17.00
Machine shop turnings	9.00 to 9.25
Cast borings	8.75 to 9.00
No. 1 cast scrap	13.00 to 13.50
Malleable	13.00 to 13.50

Gradual Elimination of Uncertainties —Numerous Structural Contracts.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, May 30.

The uncertainties which have hung over the market the past year are being eliminated at a rapid rate. Just a year ago the injunction which the United States attorney general obtained against the railroads, to stop a general advance in rates, precipitated the dull period which followed. The rate case was finally disposed of three months ago, and now leading railroad officials concede that the decision was just and that it was fortunate they did not obtain the higher rates for which they clamored. The long pending supreme court decisions have disappointed the pessimists who looked for serious trouble when they were handed down. Even the change in party control of congress has lost its terrors, and the special session is no longer looked upon as a disturbing factor. The west has come forward with the brightest prospect for crops that has ever been known at this time of the year. The railroads are doing so well in earnings, in the face of general depression in business, that hopes are entertained of a more liberal buying policy after the turn of their fiscal year. It would seem as though the long period of "liquidation," as the bankers call it, had about run its course. The pig iron market in Chicago, during May, was the dullest period that has been known in years. Prices of southern iron broke through $11, which had been considered rock bottom. Even in 1908 the southern market did not go below $11, and in 1909 only on a few large sales. Last fall, the farmers gathered the largest corn crop ever grown, and agricultural production reached the highest average in the history of the country; but in the past six or eight months the steel mills in the Chicago district have made an average of only 50 to 60 per cent of ther average production. While no one has ever been able to forecast successfully the ebb and flow of the tides of the steel industry, it would seem as though the present ebb tide has gone about as far as the general condition of the country will permit. The pending flurry over prices may prove the turning point in the market.

Pig Iron.—The Chicago market has not been so stagnant in many years as during the past month. A leading southern interest recently canvassed by telephone the principal buyers in this territory and found they were not interested in any deliveries except fourth quarter of this year or the first half of 1912, and then only at the prices now quoted for prompt shipment. While $11 is the nominal quotation for southern iron, the actual market is from $10.50 to $11, for the remainder of this year, the prices varying according to the grade or popularity among foundries of the iron offered. There are no real inquiries pending. The local furnaces are doing a little better but only because during the past year they have not been selling far ahead, and their regular customers come back from time to time for small lots. The gray iron foundries are buying very little scrap even at the present low prices. The malleable foundries seem to have a little more business.

The following prices represent the market for Chicago delivery, except northern iron, which is quoted f. o. b. furnace:

(Shipment this year.)

Lake Superior charcoal	$17.00
Northern foundry No. 2	15.00
Southern foundry No. 2	15.10
Southern silveries, 5 per cent silicon	16.35
Jackson Co. silveries, 8 per cent	18.40
Malleable Bessemer	15.00
Alabama basic	15.10

Billets.—The market is in an unsettled state on account of irregular quotations by independent eastern mills which sell in this territory. The leading interest has continued to quote $30.60 for open-hearth forging billets.

Merchant Bars.—The market has not found its bearings since the independent action of the Republic Iron & Steel Co., last week, in reducing prices $3 per ton on soft steel bars. All the other companies in this territory are meeting the reduction and there is some talk that prices may go still lower but a movement like this usually requires several weeks to run its course. Some of the mills have no official advices regarding changes in hoops, tire steel and other collateral bar mill products, while others are quoting the same reduction as on soft steel. Reports from Pittsburg indicate that contracts for soft steel bars amounting to from 60,000 to 70,000 tons have been placed, but Chicago offices have no definite estimate of the tonnage closed.

We quote, Chicago delivery, as follows:

Bar iron, 1.20c to 1.25c; hard steel bars, rerolled, 1.25c to 1.30c; soft steel bars and bands and small shapes, 1.43c to 1.48c, base; hoops, 1.63c to 1.68c; planished or smooth finished tire steel, 1.63c to 1.68c, base; iron finished tire steel, 1.58c, base; smooth finished machinery steel, 1 inch and larger, 1.98c. Shafting 57 per cent off list for carload lots, 52 per cent off for less.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.80c to 1.90c per pound base; soft steel bars, 1.70c to 1.80c per pound base; soft steel hoops, 2.10c to 2.20c, full extras.

Structural Material.—Structural contracts reported let in this market last week are as follows:

The Mallers building, Chicago, 4,000 tons, to Hansell-Elcock Co. and South Halsted Street Iron Works; the Hamilton Club building, Chicago, 1,178 tons, to the Toledo Bridge & Crane Co.; the producer building for re-heating furnaces, 200 tons, and the reheating furnace building and billet storage, 550 tons, for the Minnesota Steel Co., New Duluth, Minn., to the American Bridge Co.; steel work for remodeling section No. 55, Western Electric Co.'s building at Hawthorne, Ill., 363 tons, to the Vierling Steel Co.; crane runway for the Haskell Barker Car Co., Michigan City, Ind., 160 tons, to the Lackawanna Bridge Co.; bridge to carry pipe line across Nisqually river, Tacoma, Wash., 274 tons, to the American Bridge Co.; also the post office building, Roswell, N. M., 104 tons; and the Escanaba & Lake Superior Railroad Co. bridge, 100 tons.

We quote, structural material, f. o. b. Chicago, as follows:

Beams and channels, 15 inches and under, 1.53c. For extras, see Pittsburg report.

Plain material out of store is as follows:

All angles, 3 inches and larger, including 6 inches, $1.80 to $1.85 per 100 pounds; angles over 6 inches, $1.90 to $1.95 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.75 per 100 pounds, base; channels, 3 inches and larger, $1.75 per 100 pounds, base.

Rails and Track Supplies.—The Illinois Steel Co. booked 10,000 tons of standard rails last week and received definite inquiries for about 50,000 tons, the latter item not including the much-talked-of St. Paul tonnage. Both the open-hearth mill at Gary and the Bessemer mill at South Works are running steadily, although not at full capacity. The rail business for the first half has fallen short of last year, but at the rate orders and inquiries are coming in the last half will make a much

better showing. Owing to the policy of the railroads in withholding annual contracts and placing orders for prompt shipment, rail orders have not attracted much attention this year, but the mills are doing as well in this line as in any other finished products. Track supply business is running at about the same rate, chiefly in orders for prompt shipments.

For prices on standard sections, see Pittsburg report.

We quote, light rails, f. o. b. Chicago, and track supplies, f. o. b. Joliet, as follows:

Light rails, carloads, 40 to 45-pound, 1.16c to 1.20½c; 30 to 35-pound, 1.19½c to 1.24c; 16, 20 and 25-pound, 1.20½c to 1.25c; 12-pound, 1.25c to 1.29½c.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section relaying rails, subject to inspection, $23.50 to $24.

Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.65c to 1.75c; smaller size spikes, 1.70c, base; track bolts with square nuts, 2.15c to 2.25c, base.

Plates.—Trade has been quiet during the past week, owing to the general tendency of buyers to await the outcome of the price situation. Chicago mills are running at about 60 per cent of capacity.

We quote, mill prices, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches wide, 1.58c. For extras, see Pittsburg report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.80c to 1.85c.

Sheets.—New business is light, as this is one of the lines in which lower prices have been expected.

We quote, store prices, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.10c; No. 12, 2.15c. Box annealed, No. 28, 2.75c. Galvanized, No. 28, 3.65c.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents.

Wire Products.—Jobbers have been notified that all contracts at old prices on which specifications have not been furnished within the stipulated 60 days, will be cancelled June 1. This is done to promote harmony in the jobbing trade. Some jobbers made conservative estimates of their requirements before the market advances last winter, while others bought heavily. In many cases, jobbers who had unspecified tonnages still due them were selling to the retail trade on the old basis, thus placing at a disadvantage their competitors who are now paying the full current price. The cancellation of these old contracts will place jobbers on a more nearly equal basis.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.13; painted barb wire, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers', less than carload lots, $2.13; with 30c for galvanizing; plain wire to jobbers, $1.78; plain wire, retailers' carload lots, $1.83; staples, bright, $1.98.

Merchant Pipe and Tubes.—Labor difficulties throughout the country have checked the movement of pipe. In Chicago, the trade is at a standstill on account of a local war between rival unions of plumbers and steamfitters, which has stopped all work in their lines. Prices remain firm and a fair amount of current business is being done for outside delivery.

We quote, iron and steel pipe and tubes, out of store, as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛-⅜ inch	69.2	54.2	63.2	48.2
½ inch	72.2	59.2	66.2	53.2
2 in. to 3 in.	77.2	66.2	72.2	61.2
4½-6 inches	74.2	63.2	69.2	58.2
7-12 inches	71.2	54.2	67.2	50.2
EXTRA STRONG PLAIN ENDS.				
½ inch	70.2	63.2	54.2	52.2
2-3 inches	75.2	68.2	61.2	55.2
7-8 inches	65.2	....	59.2	47.2
DOUBLE EXTRA STRONG.				
½ inch	58.2	50.2	....	....
2-3 inches	63.2	55.2	....	....
7-8 inches	53.2	41.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	39	..	57½
1¼ to 2¼ inch	55	40	35
2¾ to 3¼ inch	62½	50	46

Cast Iron Pipe.—The leading interest was awarded last week lettings of 3,000 tons of water pipe at St. Louis; 1,200 tons at La Crosse, Wis., and 400 tons at Bay City, Mich., besides other scattering lots. There is a good volume of inquiries of small lots from 50 to 100 tons, for municipal use and for gas companies. The railroad demand is light.

We quote the market, f. o. b. Chicago, as follows:

Four-inch water pipe, $25; 6 to 12 inches, $24.50, larger sizes, $24; gas pipe, $1 a ton higher.

Old Material.—The break in bar prices has apparently brought in no large contracts for the mills as yet, judging from the demand for scrap. Many of the mills which are active in the bar trade are large consumers of scrap and they aim to cover their sales contracts at all times by purchasing an equivalent amount of scrap. There is no movement in the market to indicate an active demand from these mills. Prices are weak and the leading buyer of heavy melting steel has temporarily stopped deliveries. Malleable foundries are taking a fair tonnage of malleable scrap, but the demand from gray iron foundries is very light. The Chicago, Rock Island & Pacific has offered a monthly list of 2,165 tons, closing May 29. The Evansville & Terre Haute had a small list last week amounting to 240 tons.

We quote the market for delivery in consumers' yards, Chicago, as follows:

GROSS TONS.	
Old car wheels	$12.75 to 13.25
Old iron rails	14.50 to 15.00
Rerolling rails (5 ft. and over)	12.25 to 12.75
Old steel rails (3 ft. and under)	11.25 to 11.75
Frogs, switches and guards	10.25 to 10.75
Heavy melting steel	10.25 to 10.75
Shoveling steel	10.00 to 10.50
NET TONS.	
No. 1 R. R. wrought	**$11.00 to 11.50**
No. 2 R. R. wrought	**10.00 to 10.50**
Arch bars and transoms	13.50 to 14.00
Knuckles, couplers and springs	10.00 to 10.50
Shafting	15.00 to 15.50
Iron car axles	18.00 to 18.50
Steel car axles	16.50 to 17.00
Locomotive tires	16.00 to 17.00
Dealers' forge	10.00 to 11.00
Pipes and flues	8.00 to 8.50
No. 1 cast	10.75 to 11.25
No. 1 busheling	8.75 to 9.25
No. 2 busheling	6.75 to 7.25
No. 1 boiler cut	7.50 to 8.00
Boiler punchings	12.50 to 13.00
Cast and mixed borings	5.25 to 5.75
Machine shop turnings	6.25 to 6.75
Railroad malleable	10.25 to 10.75
Agricultural malleable	9.25 to 9.75
Stove plate and light cast scrap	9.25 to 9.75
Angle bars, splices, etc., iron	12.50 to 13.00
Angle bars, steel	10.25 to 10.75

CLEVELAND

General Suspension of Buying While Awaiting Developments.

Office of THE IRON TRADE REVIEW,
Penton Building, May 30.

As far as lake trade is concerned the cut in steel prices will have no appreciable effect. Managers who did not intend to start their vessels until June 15 or July 1 have not changed their plans. They expect the iron trade to be unsettled for some time and do not believe the cut in prices will be a stimulus to immediate buying. The ore shippers are having all that they can do to keep their own vessels moving. So little support is given to the market in other trades, the grain shippers for instance bring out of the market even at 1 cent a bushel, that some vessel owners will retire their vessels as soon as their insurance policies expire. It will be understood that the old insurance policy holds over for a few early months. The redeeming feature of the lake business is the coal trade, which is quite active for such vessels as can engage in it. The large carrier is excluded owing to lack of water in the smaller ports and the demand, therefore, for small tonnage is quite brisk.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old

range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—If it is possible for the market to be less active than it was last week, that condition now prevails. The general unwillingness to place orders has been made more pronounced by uncertainty in the finished material market. We quote, delivered in Cleveland, for prompt shipment, as follows:

No. 1 foundry	$14.50
No. 2 foundry	14.25
No. 2 southern	14.85 to 15.35
Gray forge	13.25
Bessemer	15.90
Lake Superior charcoal	17.50
Jackson Co. 8 per cent silvery	18.50

Coke.—There is no interest in the market, and prices continue unchanged. We quote:

Connellsville furnace coke, $1.40 to $1.50 for prompt delivery, and $1.80 for second half. Connellsville foundry coke, $1.95 to $2 for prompt, and $2 to $2.40 for second half.

Finished Material.—Owing to the reduction in the price of steel bars, there is a general suspension of placing of contracts for other materials that may be affected. In the case of the Y. M. C. A. building, it was fully expected that the contract would be placed before this time, but no action has been taken, as the association, like many other buyers, is awaiting action on prices of structural material. Specifications have declined to a considerable extent during the week. This also is attributed to the price situation. Some buyers are willing to contract at 1.25c for bars, but expect to be protected in case of decline. The Union and Empire iron mills were closed for Monday and Tuesday, but will resume Wednesday. They have very few orders on hand.

Old Material.—No change is noted locally in the market, there being little demand from either mills or steel makers. Some inquiry has been put out for turnings, but the suggested price did not appear attractive to sellers. Outside interests are not taking more material than they need from day to day. The following quotations, gross tons, f. o. b. Cleveland, are altogether nominal:

Old iron rails	$15.00 to 15.50
Old steel rails (under 6 ft.)	13.50 to 14.00
Old steel rails (over 6 ft.)	12.00 to 12.50
Relaying rails	20.50 to 21.00
Old car wheels	12.50 to 13.00
Old steel boiler plate	10.00 to 10.50
Malleable iron (railroad)	12.25 to 12.75
Steel axles	19.00 to 19.50
Axle turnings	8.00 to 8.50
Malleable iron (agricultural)	11.00 to 11.50
Heavy steel	11.50 to 12.00
Country mixed steel	9.50 to 10.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$12.50 to 13.00
No. 1 busheling	11.00 to 11.50
No. 1 machine cast	11.50 to 12.00
No. 1 dealers' wrought	11.00 to 11.50
Machine shop turnings	6.50 to 7.00
Cast borings	6.00 to 6.50
Pipes and flues	8.00 to 8.50
Wrought drillings	6.50 to 7.00
Stove plate	10.50 to 11.00

CINCINNATI

Buying of Pig Iron Confined to Small Lots—Prices Soft.

Office of THE IRON TRADE REVIEW, 808 Provident Bank Bldg., May 30.

Pig Iron.—There is hardly enough buying to test the market to determine exactly what prices could be made on a fair tonnage for third or fourth quarter. Southern No. 2 is generally obtainable at $10.50, Birmingham, for the second and third quarter, while few buyers care to consider the last quarter, at a price that the furnace interests will make. A little better spirit is evident, but the only buying is very small lots for hand-to-mouth use. An inquiry for 200 tons of foundry iron in central Ohio is still open, as is one for 300 tons of foundry in northern Indiana; 200 tons of high silicon have been taken by an Indiana melter and about 800 tons of northern foundry iron has been sold to nearby melters. Specifications continue fairly good. There is no demand for malleable or basic. Based on a freight rate of $3.25 from Birmingham, and $1.20 from Ironton, we quote, Cincinnati and southern Ohio, as follows:

Southern foundry No. 2	$13.75
Southern foundry No. 3	13.25
Southern foundry No. 4	13.00 to 13.25
Southern gray forge	12.75 to 13.00
Mottled	12.50 to 12.75
Southern No. 1 soft	14.25 to 14.75
Southern No. 2 soft	13.75 to 15.25
Standard southern car wheel	25.50 to 25.75
Northern No. 2 foundry	14.95 to 15.20
Northern No. 3 foundry	14.45 to 14.70
Northern No. 4 foundry	14.20
Jackson county 8 per cent silicon	17.20

Coke.—There is little change in any brand of coke. Foundry coke is firm at $2 with many contracts coming up, most of which are being renewed at quoted figures. There is little premium being paid for contract business and the standard brands can be had for prompt, six months or year contracts, at practically the same figures. Considerable gas coke is being sold at about $1.80 for 2,000 to 5,000-ton, monthly quantities. Connellsville furnace coke continues weak. We quote the producing districts as follows:

	Prompt shipment.	Contract second half.
Connellsville district:		
Foundry coke	$2.00 to 2.25	$2.15 to 2.35
Furnace coke	1.35 to 1.60	1.75 to 1.85
Wise county district:		
Foundry coke	2.00 to 2.25	2.10 to 2.35
Furnace coke	1.75 to 2.00	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	2.00 to 2.15	2.10 to 2.35
Furnace coke	1.60 to 1.75	1.75 to 1.85
New river:		
Foundry coke	2.50 to 3.25	2.60 to 3.25
Furnace coke	2.10 to 2.15	2.10 to 2.20

*Sliding scale basis means $1.60 for coke based on $9, Birmingham for pig iron, with an advance of 16 2-3 per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—The reduction of steel bars to 1.25c, Pittsburg mill base, has brought out a number of good contracts, although it is doubtful if activity will be greatly increased, as considerable steel had been sold previously at a figure somewhat under the old quotation. The Louisville & Nashville railroad is planning a number of additons to its shops, including those at Evansville, Ind., and New Decatur, Ala., which will require considerable structural steel.

Old Material.—The only changes in the scrap market are some reductions in prices and a little activity in rerolling steel. Little scrap is wanted by the foundries just now, and further reductions will probably be made soon, if pig iron continues to soften. We quote the old material market for delivery in consumers' yards, Cincinnati and southern Ohio, as follows:

GROSS TONS.

Old iron rails, gross	$14.00 to 14.50
Old steel, rerolling, gross	13.00 to 14.00
Old iron axles, gross	19.25 to 19.75
Steel melting scrap, gross	11.00 to 11.75
Car wheels, gross	11.50 to 12.50

NET TONS.

Old No. 1 R. R. wrought	$12.25 to 12.75
No. 1 machinery	10.50 to 11.00
No. 1 busheling	8.50 to 9.00
Stove plate	8.25 to 9.00
Machine shop turnings	6.50 to 7.00
Cast borings	5.50 to 6.25
Grate bars	7.75 to 8.50
Sheet scrap, bundled	7.50 to 8.50
No. 1 cast scrap	10.50 to 11.00
Heavy turnings	7.75 to 8.75

NEW YORK

Market Has Been Awaiting Action on Prices—Some Railroad Business.

Office of THE IRON TRADE REVIEW, 1115 West Street Bldg., May 30.

Pig Iron.—Sentimental influence of the break in steel prices has been felt in the pig iron market and purchasing has been more laggard since the announcement of the action of the Republic Iron & Steel Co. upon its various products. Recent lower prices made in different eastern producing sections which have now become more extended, has spurred on considerable negotiation through the appreciation by buyers of the apparent bargains offered and selling has become more active. This interest has become less marked and consumers are waiting for further developments in the steel situation and their effect upon pig iron prices. Some additional selling of Virginia iron has been done the past week in seaboard and New England territory, but the volume has

been considerably less than that brought out by the original offer of lower prices of the leading Virginia producer. On the face of conditions, it would appear that this maker has not yet disposed of the 25,000 tons it started out to move, but the business in Virginia iron is now more scattered through the disposition of some of the other Virginia furnaces to protect their customers. Not all of them, however, will meet the $12.25 and $12.50 furnace prices for third and fourth quarters put out by the largest maker in that territory. It is significant that most of the Virginia iron recently bought has been taken by regular customers for this iron who have been impelled by the lower prices to anticipate their forward needs. Eastern Pennsylvania makers have been forced to cut their prices 25 cents a ton and standard No. 2X iron from the Lehigh and Schuylkill valleys is quotable at from $14.50 to $14.75 furnace or $15.25 to $15.50 at tidewater. Some Buffalo makers will now do as low as $13.25 furnace for 2X. Where freight rates by water are at assured rates, makers in Buffalo territory will sell to Jersey City points at $1.25 freight and to Sound points at $1.75 freight. A handling charge of about 15 cents is added. While leading buyers of malleable in Connecticut are understood to have bought some iron from Buffalo at $13.25 furnace, the greater part of the large tonnage recently sought by these interests is under negotiation. The Canadian Car & Foundry Co. is still in the market for 2,500 to 3,000 tons of low phosphorus iron for forward shipment at Welland, Ont., and has been quoted English iron around $20.75 to $21 delivered, duty paid. It is currently reported that a leading southern seller is now freely offering iron for forward shipment upon the basis of $10.50 Birmingham for No. 2.

We quote for prompt and third quarter shipment as follows:

Northern foundry No. 1	$15.00 to 15.50
No. 2X foundry	14.50 to 15.25
No. 2 plain	14.25 to 14.50
No. 2 Virginia	15.05 to 15.30
No. 2 southern foundry	14.50 to 15.00
Malleable	14.50 to 15.00
Gray forge	14.75 to 15.00

Ferro-Alloys.—Buyers of ferro-manganese report having been approached by sellers with propositions for first half delivery of next year at substantially the ruling quotations. An Ohio steel work, has bought 300 tons for June, July and August shipment at $36.50, Baltimore. Ferro-alloys as a whole show quiet demand. We quote 80 per cent ferro-manganese at $36.50 to $36.75, Baltimore, and 50 per cent ferro-silicon at from $53 to $53.50, Pittsburg.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has been awarded 2,750 tons of 12 to 24-inch sizes for Boston. No announcement has yet been made of the maker for the 17,000 tons for metropolitan boroughs upon which contractors' bids were recently opened. Yonkers, N. Y. will take bids June 5 on 1,200 tons. Conditions in the market follow the same order, sharp competition among the makers on public and private work being the rule. We quote 6-inch pipe at from $21 to $21.50 f. o. b. New York in carload lots.

Finished Material.—Interest in finished materials this week has focused upon what price action in manufactured products in general would be deemed advisable by iron and steel makers as a result of the situation imposed upon them by the break of the Republic Iron & Steel Co. A number of the independent manufacturers met in this city today with Chairman E. H. Gary of the United States Steel Corporation and considered the conditions in the trade as reported elsewhere in this issue.

Structural interests state that the uncertainty over prices has seriously checked the market, which up to the developments of the past week, was exhibiting accumulating vigor. Prospective awards are now being held up by buyers for further information as to prices.

In the discussion of plain shape and fabricated prices, the noteworthy statement is made by makers that there is less margin at present between the plain material level of 1.40c, Pittsburg, and fabricated quotations, than has ever before prevailed. As far as known, the lowest fabricated price recently made in the New York market is $45, erected, including a $3.20 freight from Pittsburg, which was done on pier construction. The previous low mark known in the east was at $38, erected, Boston, for bridge work, made in 1894, when plain material was selling at 90 cents, Pittsburg.

Bids are going in today for the center span and the viaducts on Randall and Wards Islands for the Hell Gate bridge, which will require about 36,000 tons of plates and shapes, of which 17,000 tons is plates. This work represents about one-third of the entire steel requirements, as no viaducts on the mainland or on Long Island are included in this letting. The Harriman lines have released specifications for 12,000 tons of bridge work to the American Bridge Co. Fabricated steel contracts of the week include 1,600 tons to the American Bridge Co., for the Thirty-third street pier, Brooklyn, of which Snare & Triest have the general contract; 1,100 tons to the American Bridge Co., for the Armour fertilizer plant, at Chrome, N. J.; 1,000 tons to the American Bridge Co., for a power house for the Bush terminals in Brooklyn; 200 tons to the Pennsylvania Steel Co., for a lift bridge for the Atlantic Coast Line, at Navassa, N. C.; 200 tons of bridge work by the New Haven railroad to an independent shop, and other scattering lettings. The formal award for 4,300 tons for the Philadelphia & Reading elevated work in the Port Richmond district, Philadelphia, was made this week to the American Bridge Co. Wells Bros. have the general contract for the Riggs hotel and theater, Washington, and the 2,000 tons required are expected to go to the American Bridge Co. The Whitney-Steen Co., New York, has the general contract for the Commercial National Bank building, Charlotte, N. C., 800 tons.

No decision on the plain material for the New York Telephone Exchange building has been made. Bids go in Thursday for 2,700 tons for reinforcement of the Williamsburg bridge, this city, and on 800 tons for a highway bridge at McElhatton, Pa. Action is still pending on the 3,900 tons for the Aeolian building, this city; on 6,000 tons for the Bamberger store, Newark, N. J., and numerous other contracts in the east. The Arbuckle Bros., Brooklyn, have a power house pending.

We quote, delivered at tidewater, as follows:

Angles, 3 to 6 inches and heavier, 1.51c; tees, 3 x ¼ inch and heavier, 1.51c; plates, carload, tank, 1.51c; boiler steel, 1.61c; marine boiler, 1.91c; bar iron, 1.30c to 1.35c; soft steel bars, 1.41c.

Rails and Track Material.—The Missouri Pacific railroad is in the market for 40,000 tons of standard sections. No additional rail contracts of importance have been announced.

Old Material.—Buyers continue to fill their needs by a policy of hand-to-mouth buying in which they are getting the benefit of occasional lots sold at sacrifices. While the market is not strong on the present basis, and there is a disposition to expect a quiet summer, it is doubtful if sizable lots could be procured without stiffening values in some degree. We quote gross tons, prices New York dealers will pay at tidewater, with the exception of cast scrap, which has a local demand, as follows:

Old car wheels	$11.50 to 12.00
Old iron axles	21.50 to 12.00
Old steel shafting	15.50 to 16.00

Heavy melting steel	10.75 to 11.00
No. 1 R. R. wrought	13.00 to 13.50
Iron track scrap	12.00 to 12.50
Wrought pipe	10.00 to 10.50
Cast borings	5.75 to 6.00
Wrought turnings	6.00 to 6 50
Heavy cast scrap	11.50 to 12.00
Railroad, malleable	10.00 to 10.50
Stove plate	9.00 to 9.50
Grate bars	9.00 to 9.50

PHILADELPHIA

Market Awaiting Final Price Announcement.—Little Business Placed.

May 29.

Interest of both consumers and makers of finished lines has dealt this week with the price developments that may follow from the action of the Republic Iron & Steel Co. in breaking away from co-operation with other producers. As yet all positive changes in prices have concerned steel bars, which have declined to 1.25c base, Pittsburg, or 1.40c Philadelphia.

Pig Iron.—The indifference of buyers in the market continues in marked evidence. Price concessions have become more general and though they have brought different grades in line with the previous views of buyers, they have not brought out a great amount of business, which otherwise might not have been placed until later intervals. Some Virginia makers are now meeting the cut prices of $12.25 furnace for 2X for third quarter and $12.50 furnace for fourth quarter recently put out by the leading producer in that territory and it is understood that some high silicon iron has sold at $12, though it is not unusual for iron of this class to sell at times below the regular No. 2X grade. Other makers will not go below $12.50 furnace for No. 2X and one furnace is contemplating blowing out rather than shade its $13 schedule. The sum total of sales of the different Virginia interests in this and local districts has not been heavy. The orders booked by the largest maker are still short of the 25,000 ton mark, which it set out to reach at the cut prices. Eastern Pennsylvania makers of standard No. 2X are dropping their schedules to make them more nearly coincide with the delivered quotations on Virginia iron, but generally they are not going below $15.25 delivered for No. 2X, for third quarter, a concession of 25 cents. Virginia iron to some points in this territory can be had at $15.05 delivered, for this period. No recent additional sales of basic have been made to eastern steel works, but one leading consumer has a new inquiry out for 6,000 tons for fourth quarter. It is established, however, that in more than one instance $14.50 delivered for this grade has been done, but the total of these lots is largely a matter of conjecture, since sellers are not vouchsafing details. Not all eastern basic makers, however, will do the $14.50 delivered price. One large block of low phosphorus iron continues under negotiation for a buyer in this district. A leading southern seller is now freely offering No. 2 iron at $10.50 Birmingham for forward shipment.

We quote for prompt and third quarter shipment as follows:

No. 1X foundry	$15.50 to 16.00
No. 2X foundry	15.25 to 15.50
No. 2 plain	14.75 to 15.25
Standard gray forge	14.75 to 15.00
Basic	14 50
No. 2X Virginia	15.05 to 15.30
No. 2 southern	14.50 to 15.00
Standard low phosphorus	21.00

Structural Material.—Because of the fact that the Republic Iron & Steel Co. is a maker of small angles, some of which extend into the structural classification, buyers of angles, beams, channels and other shapes have renewed their efforts this week to break the 1.40c base, Pittsburg, price, but they have been unsuccessful. The Republic company is a maker of angles up to and including 6 inches, but those under 3 inches are on the regular steel bar card and take the usual bar extras or 10 cents, which on the 1.25c bar base is equivalent to 1.35c Pittsburg, or 1.50c Philadelphia. At this price, the bar makers on these small angles are underselling by $1 a ton those shape makers not producing steel bars, which sell angles of this size at the regular structural schedule of 1.40c base, Pittsburg, or 1.55c Philadelphia. On angles from 3 to 6 inches, in which the Republic company competes with regular shape makers, the same price as bars, or 1.25c base Pittsburg, was first applied by the former company. This price was subsequently withdrawn when it became apparent that other makers were holding firmly at 1.40c base, Pittsburg, for these sizes. One lot of 350 tons of 3 to 6-inch angles was placed Friday with an eastern mill at full prices and in competition with the Republic mills. The final quotations on this lot were uniformly 1.40c base, Pittsburg. Bids have been entered on some good-sized work in the east, but awards are pending, including the Riggs hotel, Washington 2,000 tons, and the Commercial National Bank building, Charlotte, N. C., 800 tons. Action is expected soon on the Norfolk Terminal building, Norfolk, Va., 1,200 tons. Steel plans for the Syndicate building, Richmond, are expected about June 1. The government bureau of yards and docks will take bids June 3 on 2,500 tons for buildings at Pearl Harbor, Hawaiian Islands. Bethlehem columns will be used in the Maryland Casualty Co. building, Baltimore, and the Army and Navy club, Washington. Recently awarded contracts for 1,700 tons of shapes for viaduct construction at Scranton, Pa., were placed with eastern mills at full prices at the close of the week.

Structural shapes, 1.55c to 1.60c; steel plates 1.55c to 1.60c; steel bars, 1.55c to 1.60c; refined bar iron, 1.27c to 1.32c; cut nails, $1.75 to $1.80; blue annealed sheets, No. 10 gage, 1.70c to 1.80c; 4 x 4-inch open-hearth rolling billets, $25.40; forging billets, $30.40.

Bars.—Only a very moderate amount of new business in steel bars has been placed in the east at the reduced price of 1.25c base, Pittsburg, originally made by the Republic company, but now being generally met by all makers. The cut has not greatly disturbed eastern steel makers directly, as steel bar production in eastern territory is relatively unimportant. Eastern bar iron makers are now freely quoting 1.20c mill, equivalent to 1.27c Philadelphia, or $2.60 per ton under steel. Prior to the steel bar cut, the 1.20c mill price was done in scattered cases.

Old Material.—There is still outstanding a number of short sales made by brokers during the upturn of prices several months ago, and these are being covered at intervals at levels somewhat above the market paid by consumers. Some sales of heavy melting steel of this character were made the past week at $13.25, delivered. Fresh sales to the eastern steel works, which are few and of small tonnage, individually are being done at $13, delivered, and in some cases at $12.75, delivered, though these usually represent material being moved at a sacrifice. Other grades are in light demand and prices are easy, being frequently shaded 25 cents to meet the views of buyers. We quote gross tons, delivered in eastern Pennsylvania and New Jersey consuming territory, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (re-rolling)	13.75 to 14.00
Heavy melting steel	12.75 to 13.25
Old car wheels	13.00 to 13.50
Old steel car axles	18.00 to 19.00
Old iron car axles	25.00 to 26.00
No. 1 R. R. wrought	15.00 to 15.50
Wrought pipe	12.50 to 12.75
Cast borings	7.50 to 8.00
Wrought turnings	8.50 to 9.00
Heavy cast scrap	13.00 to 13.50
Railroad malleable	11.50 to 12.00
Stove plate	10.00 to 10.50

Calumet & Arizona Mining Co. has declared a quarterly dividend of $1 a share, payable July 3.

Pig Iron Buyers Withhold Orders and Inquiries Are Few.

May 29.

Pig Iron.—The market for pig iron is somewhat unsteady in the St. Louis territory, but buyers are not expressing any anxiety to place contracts, believing that the situation in general is such as to warrant them withholding their orders and awaiting developments. One sale was made last week of 600 tons of southern iron for last half delivery, but scarcely any inquiry is out. The idea is expressed that the new price of 1.25c on soft steel bars may have a tendency to cause consumers of pig iron to test the market for that commodity soon. Prices on southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$14.75
Southern No. 2	14.25
Southern No. 3	14.00
Southern No. 4	13.75

Coke.—The sale of 5,000 tons of by-product coke reported in The Daily Iron Trade Review, of Monday, as known to having been made in the St. Louis territory last week, is the most important transaction in coke that has taken place for some time. Several water gas plants are about to close fair shipping contracts, and one agricultural concern in Indiana is asking for prices on stock coke in three to five cars a month for a period of one year. Coke prices are a little firm, and in the St. Louis territory are about as follows:

We quote 72-hour Connellsville foundry grades, $1.90 to $2.40 for whole of 1911; 72-hour foundry, $1.90 to $2.15 on tracks and for immediate delivery; 48-hour Connellsville furnace, $1.40 to $1.50; best 72-hour Virginia foundry, $2 to $2.25; 48-hour Virginia furnace, $1.60 to $1.85. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—In view of the recent cut in steel bars, the market for structural steel has quieted somewhat, and buyers seem willing to wait until the situation clears up. The Westlake Construction Co., of St. Louis, has been awarded the contract for a hospital addition in Cincinnati, which will require a small tonnage of steel, although it is understood that from 600 to 700 tons of reinforcing bars will be needed. Plates are in fair demand. The new price of 1.25c for bars, made by the Republic Iron & Steel Co., Pittsburg basis, has been met by the large interests, but has not caused any large buying movement, as buyers are somewhat uneasy about what the future market will be. The Missouri Pacific Railroad Co. is in the market for 40,000 tons of steel rails. The demand for fastenings is fair and prices are steady. While some orders for light rails are being placed, in view of the approaching summer, the demand from mining interests has fallen off. The W. J. Lemp Brewing Co. is asking for prices on about 500 to 600 tons of steel, to be used in constructing a new stock house, and about 200 tons will be needed in erecting the Empress theater, which is now assured.

Old Material.—The demand for scrap iron shows no improvement, and prices are unchanged as follows:

Old car wheels	$12.50 to 13.00
Old iron rails	13.50 to 14.00
Rerolling rails (4 ft. and over)	12.00 to 12.50
Old steel rails (2 ft. and under)	11.00 to 11.50
Light section relayers, 45 lb. and under, subject to inspection	19.50 to 22.00
Relaying rails, subject to inspection	24.00 to 24.50
Frogs, switches and guards	11.50 to 12.00
Heavy melting steel	11.50 to 12.00
Shoveling steel	11.00 to 11.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.00 to 11.25
No. 2 R. R. wrought	10.00 to 10.25
Arch bars and transoms	13.25 to 13.50
Knuckles, couplers and springs	12.00 to 12.50
Shafting	14.25 to 14.50
Iron car axles	18.00 to 18.50
Steel car axles	17.00 to 17.50
Locomotive tires	14.00 to 14.50
No. 1 country wrought	9.50 to 10.00
Pipes and flues	8.00 to 8.50
No. 1 busheling	9.25 to 9.50
No. 2 busheling	6.00 to 6.50
No. 1 boiler cut	7.50 to 8.00
Boiler punchings	9.00 to 9.25
Cast and mixed borings	5.00t o 5.50
Machine shop turnings	6.50 to 7.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	8.50 to 9.00
Stove plate	9.00 to 9.50
Angle splice bars, iron	11.75 to 12.25
Angle splice bars, steel	11.00 to 11.50

Business in Pig Iron and Finished Material Very Dull.

May 30.

Pig Iron.—The pig iron market is decidedly dull following the reduction in prices of some finished steel products, and while representatives of the furnaces say that there is no intention of reducing the prices of iron, buyers are holding off, and inquiries are decidedly less than last week. A fair tonnage has been placed recently. The largest lot was 2,500 tons of basic for shipment to Canada, which, as reported in The Iron Trade Review last week, went to a local furnace, and another sale of 2,000 tons is reported. There were also a few smaller sales running in the neighborhood of 500 tons. In spite of the falling off in new business, shipments on old contracts are going forward very well, and an improvement is looked for. Prices seem a little more settled. We quote, f. o. b. furnace, as follows:

No. 1X	$14.00 to 14.50
No. 2X	13.75 to 14.25
No. 2 plain	13.50 to 14.00
No. 3	13.25 to 13.50
Gray forge	13.00 to 13.25
Malleable	13.75 to 14.25
Basic	14.25 to 14.75
Charcoal	16.50 to 17.50

Finished Products.—As a result of the recent reductions, business in finished products is at a standstill. The agencies have been disinclined to make prices pending the result of the New York meeting, and buyers are also holding off. No large lettings are reported, but one or two big structural jobs will be let in the near future.

Old Material.—Business is very dull, and if any sales have been made in the last week, they were small. The prices here quoted are largely nominal. We quote gross tons, f. o. b. Buffalo, as follows:

Heavy melting steel	$12.75 to 13.00
No. 1 railroad wrought scrap	14.75 to 15.25
No. 1 railroad and machine cast scrap	14.00 to 14.50
Old steel axles	18.50 to 19.00
Iron axles	23.00 to 24.00
Car wheels	13.75 to 14.25
Railroad malleable, scrap	13.75 to 14.00
Machine shop turnings	7.00 to 7.25
Cast iron borings	6.50 to 6.75
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	16.75 to 17.25
Tank iron	10.75 to 11.25
Sheet iron	6.50 to 7.00
Pipes and flues	10.75 to 11.25
Stove plate	12.00 to 12.50
Grate bars	11.50 to 12.00
Boiler plate	11.50 to 12.00

Buyers Await Developments in the Fnished Market.

May 29.

Pig Iron.—The past week has shown a fair tonnage of bookings in pig iron here, although the generally admitted price is $10.50 to $10.75 on a No. 2 foundry basis. For the last few days, there has, however, been a perceptible slackening in the demand, which is for the most part attributed to the cut in steel bars,—buyers apparently awaiting the outcome as to the future course of the steel market, as well as other finished goods. It is believed here that if the agricutural implement interests should decide to begin buying for their requirements in steel bars, etc., for the remainder of the year, they would also take on a considerable tonnage of pig iron, and it is not felt that any concessions below a $10.50 basis could be obtained even on such a large tonnage, as such interests will undoubtedly buy when they do decide to come in the market, for their year's requirements.

Quotations for prompt shipment and for third quarter are on the following schedule per ton of 2,240 pounds, f. o. b. cars furnace yards this district:

No. 1 foundry	$11.00 to 11.25
No. 1 soft	11.00 to 11.25
No. 2 foundry	10.50 to 10.75
No. 3 foundry	10.00 to 10.25
No. 4 foundry	9.75 to 10.00
Gray forge	9.50 to 9.75
Basic	10.50 to 10.75

Old Material.—The scrap iron market here continues to pursue about the same uninteresting course that has marked the local trading in old material for many months past. Prices are unchanged on the following schedule, per gross ton here:

Iron axles	$15.00 to 16.00
Iron rails	13.00 to 13.50
Steel axles	14.00 to 14.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	11.00 to 12.00
No. 1 country scrap	8.50 to 9.00
No. 2 country scrap	7.50 to 8.00
No. 1 machinery	10.00 to 11.00
No. 1 steel	9.50 to 10.00
Old standard car wheels	11.00 to11.50
Light cast and stove plate	8.00 to 8.50

Cast Iron Pipe.—Despite the feeling of depression in other lines, there continues a marked degree of satisfaction evident with the makers of water pipe. The movement of the product is well keeping pace with production, and new inquiries continue good. Prices remain at the quotations that have prevailed for some weeks past, viz.: $23 for 4-inch to 6-inch; $22 for 8-inch to 12-inch, and an average of $21 for over 12 inches,—all per ton of 2,000 pounds, with customary differential of $1 higher for gas pipe, these prices being per net ton, on board cars at foundries, Birmingham, Bessemer and Anniston, Ala.

San Francisco

May 24.

Finished Material.—Building continues about normal, with a number of good orders in prospect. Quotations remain the same. The McClintic-Marshall Construction Co. has secured the contract for 600 tons of steel for the Security Savings Bank building in Oakland. The steel bids for the new city hall of that city, involving about 4,000 tons of material, will be opened on May 22. The citizens of Oakland have voted bonds to the amount of $2,973,000 for school buildings, most of which will be of reinforced concrete and steel. A municipal auditorium to cost $500,000 is also to be built. Several small bridge contracts for the interior and several buildings for this city are being figured. Beams and channels are quoted at 2.65c.

The demand for soft steel bars remains quiet, most of the inquiry for bars being for those of iron of local make. Bars from store are still quoted, steel, 2c, iron, 1.90c.

The demand for heavy rails continues normal, many interurban projects in all parts of the state keeping salesmen busy figuring for contracts. The board of public works has awarded the contract for a number of track specials, including switches, for the Geary Street Municipal Railway to the Pennsylvania Steel Co., the entire bill aggregating $47,000. The Ventura Railway Co. has been incorporated to build a road 30 miles long from Hueneme to Oxnard, Cal. The Sacramento-Sierra railroad is about to resume construction on its interurban line out of Sacramento; The Los Angeles & San Fernando Electric Railway Co. has announced that it will soon be in the market for material for a 25-mile line and the Southern Pacific and Santa Fe railroads are busy planning extensions and rebuilding of existing roads; $85,000 out of a capital of $500,000 has been subscribed by the Clear Lake Railroad Co., which will soon start work on a standard gage road from Hopland to Upper Lake and Kelseyville, a distance of 44 miles.

Cast Iron Pipe.—There is some improvement in cast iron pipe orders, many small bills making a fair aggregate for the past two weeks. The Crane Co. has the contract for furnishing 100 tons of 4-inch pipe to the Peoples Water Co., of Oakland, for extensions in the outlying districts. Other orders are expected from this source soon.

British Iron Market

Improvement in Tone of Pig Iron Market.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., May 30.

The only noteworthy feature in the pig iron market is a marked improvement in the tone at Middlesbrough. This has attracted a good deal of attention during the past few days, and apparently an upward movement has commenced. The statistical record of shipments is the best for three and a half years, while Connal's stores have commenced to decrease and the reduced output has apparently had its effect. There has been a rise of about 7d per ton, but it should be noted that the minimum reached represented the lowest figure for six years, and another furnace has just been blown out. There is every probability that the improved shipments will continue. The River Tees has an exceptional lot of steamers loading, and there are improved deliveries to North America. Two steamers are now loading for Baltimore and a third for Montreal. Yesterday, the decrease in Connal's stores was 3,300 tons. The amount in store is now 591,000 tons. There is also an improvement in the east coast hematite trade, with mixed numbers at 62s ($15.18) which is 6d better than the selling rate a week ago, and buyers are once more taking an interest in the market, and inclined to do business.

The finished iron and steel trade holds its own relatively better than the market for raw material. Throughout South Staffordshire, there is an improved business in bars, the makers of which have benefited considerably by the fall in pig iron, as they have not found it necessary to reduce their prices in proportion. This is the healthiest sign for some time past. In the galvanized sheet trade disorganization is extending, and prices have gone to pieces. Some makers in fact have withdrawn their quotations and certain South Staffordshire mills are not able to make more than two days per week. In the steel trade, the first important reduction for some time has to be recorded, namely, a fall of 2s in Belgian billets, which are now 91s delivered. This has compelled British makers to lower their prices, so that Bessemer billets can now be got at £4 15s and Siemens at £4 17s 6d. Generally, the influx of foreign material is on the increase. For finished material, prices are being maintained, and works are reported to be well off for business.

METAL MARKETS

New York.

May 25.

Tin.—The wide fluctuations in prices in the London market last week have caused local buyers to observe great caution, and the result has been to curtail business in this market. The syndicate of speculations put on full pressure on Wednesday and advanced the price of spot contracts to £206. This made a new high level for the metal, since May, 1906, when the high price was £216. With similar abruptness the price immediately declined to about £203 and has fluctuated within a pound or two of that figure each day since. The range of prices in the New York market has followed that of London, but always at a discount of about ½c a pound from the cost to import. As a result of the higher market abroad,

327 tons of tin were re-shipped to London recently. The local market for the metal today is nominally 44.37½c. The London closing was characterized as easy, with spot selling at £203 and three months at £188 10s. Arrivals of tin since May 1, aggregate 2,424 tons.

Copper.—Some of the important producing interests have raised their asking prices on both lake and electrolytic copper, the former to 12.50c and the latter to 12.37½c, delivered 30 days. A fair volume of business has been done for export, and there is a good inquiry from domestic consumers. The latter are reluctant to pay the advanced prices, however, and actual business with them has not reached a large total, according to reports. The recent revival of speculative interests has been well maintained. Standard copper advanced to £55 5s for spot, and £55 16s 3d for three months, in London, Wednesday, and closed today at £55 and £55 12s 6d, respectively.

Copper exports, since May 1, are 23,926 tons.

Lead.—Sales are reported from the west at the equivalent to 4.37½c in New York, but the market here for spot is from 4.40c to 4.42½c, among the independent sellers. There has been no announcement made of a reduction by the leading interests, but it seems probable there will be unless improvement in general demand comes shortly. The latter quotation is 4.50c.

Spelter.—The spelter market is characterized as dull at 5.20c, St. Louis, and 5.35c, in New York, by most trade authorities. The important consumers continue to display little interest in the metal, and there are not many people who expect to see much improvement take place until they do.

Antimony.—The antimony market is stagnant. Cookson's is 9.50c; Hallett's is 9c, and Hungarian is 7.87½c.

St. Louis.

May 29.

Lead and Zinc.—A top price of $41.30 was paid for choice lots of zinc blende in the open market in the Missouri-Kansas-Oklahoma district last week, with 60 per cent grades ranging from $40 to $37 a ton. The average price was $37.50. The price paid on the contract basis was $38.74, the lowest of the year. This was based on the average quotation for spelter of 5.205c, East St. Louis. The market for calamine was weaker at $19 to $21 a ton for 40 per cent grades, with choice lots bringing $25 a ton. Lead ore remained unchanged at $56 to $58 a ton. The surplus in the bins at the close of the week was about 10,200 tons, of which 7,700 tons could hardly be purchased at the prevailing prices.

Chicago.

May 29.

New Metals.—Copper is quoted a shade higher in the Chicago market, both for lake and casting grades, but business is confined chiefly to small lots for early delivery. Very little is being done here in spelter, but the price is quoted higher at 5.35c to 5.40c. Tin is very erratic and quotations for one day are ancient history the next.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 12⅝c to 12¾c; casting, 12½c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.35c to 5.40c; lead, desilverized, 4.32½c to 4.35c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.25 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 45c; Cookson's antimony, 10¼c; other grades, 9c to 10c.

Old Metals.—The market is very quiet as the foundries are running light and making only small purchases for immediate delivery.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

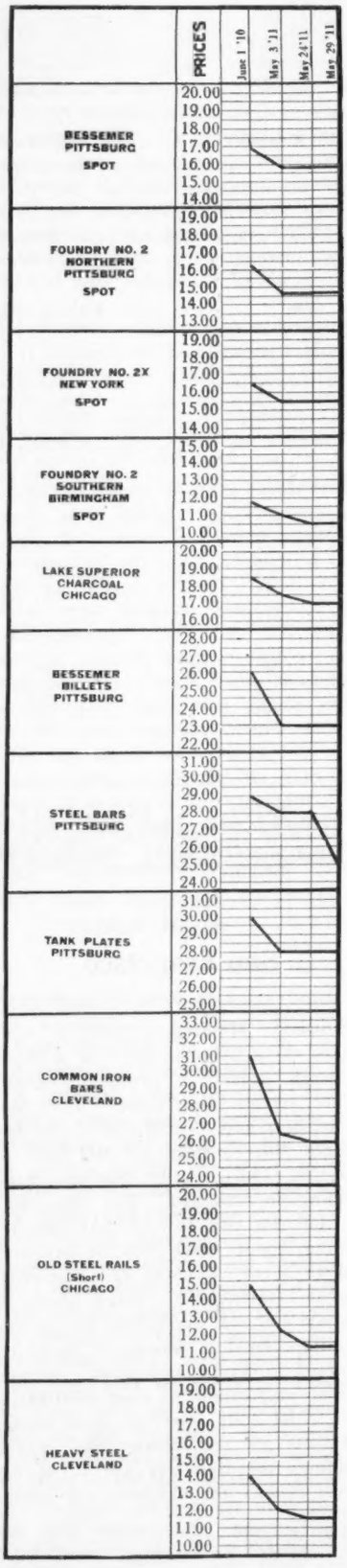
Copper wire, 12c; heavy copper, 11⅞c; light copper, 10½c; heavy red brass, 10½c; heavy yellow brass, 9c; light brass, 7c; No. 1 red brass borings, 9½c; No. 1 yellow brass borings, 7½c; brass clippings, 8½c; tea lead, 3.80c; lead scrap, 4½c; zinc, 4½c; tin pipe, 37c; tin foil, 34c; pewter, 27c; electrotype plates, free from wood, 4c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; linotype dross, 3¼c; prime slab zinc dross, $70 per ton.

Mining Force Reduced

The Oliver Iron Mining Co., the iron ore mining department of the United States Steel Corporation, has let out between four and five hundred men at their mines located at Ironwood, Mich., on the Gogebic range. The properties affected are the Norrie, East Norrie, Pabst, Aurora and Puritan. At these the night shift will be dispensed with and four days out of the week will be worked on the day shift one week and five days the following week, this rule prevailing until business improves.—*Iron Ore*, Ishpeming, Mich.

The Westinghouse Electric & Mfg. Co. has declared the regular quarterly dividend of 1¾ per cent on preferred stock, payable June 15.

PRICE CHART



PRICE REDUCTIONS

Announced by Judge Gary After New York Meeting.

A general reduction in the price of all finished steel products with the exception of wire products, tin plate, rails, hoops and tubular goods was announced by Chairman E. H. Gary, of the United States Steel Corporation, at New York, Monday night, May 29, following an extended meeting at which there was a large representation of the independent steel manufacturers, not including the Republic Iron & Steel Co. The cuts made, which are effective June 1 and for shipments to Oct. 1, are $1 a ton on plates and shapes; $1 a ton on billets and sheet bars; $2 a ton on blue annealed, and $4 a ton on black and galvanized sheets, and formal recognition was also taken of the $3 reduction in steel bars which had already been put in effect by the Republic Iron & Steel Co., and had been met by the other makers. The revised base quotations per pound on the products affected are now 1.35c, Pittsburg, for plates and shapes; 2.00c, Pittsburg, for No. 28 gage black sheets; 1.50c, Pittsburg, for blue annealed sheets No. 10 gage; 3.00c for galvanized sheets No. 28 gage, and 1.25c, Pittsburg, for steel bars. The new price for billets is $21, Pittsburg, and for sheet bars, $22, Pittsburg.

Some surprise is manifested in the trade that tube prices were not altered, as the Republic Iron & Steel Co. has lately became a maker of this line. Tube prices, however, underwent deep cuts in the previous revision of prices and are now considered at a low level. Thus far the Republic company has not been aggressive in selling tubular products since its recent announcement.

The New York meeting of steel makers was a most important one and the situation in the trade precipitated by the action of the Republic Iron & Steel Co. in cutting the market was gone over very thoroughly. It was after 6 o'clock, Monday evening, when the meeting adjourned and Judge Gary, upon his return to his hotel, then prepared and later gave out a statement of the action taken. This statement is as follows:

Representatives of the leading manufacturers of finished steel (except the Republic) met at luncheon at the Metropolitan Club, today, and existing conditions were fully discussed. It was the unanimous opinion that co-operation, as heretofore fully explained, should be continued.

Opinions were expressed that recent developments seem to require some changes in prices. Subsidiary companies of the United States Steel Corporation have decided to make adjustments to become effective June 1, and it is believed that these will be generally followed. The commodities affected, with the new prices, are as follows:

Steel bars (15 cents per 100 pounds off), $1.25 base.

Plates and structurals (5 cents per 100 pounds off), $1.35 base.

Black sheets (20 cents per 100 pounds off), 2 cents per pound for No. 28 gage.

Galvanized sheets, 3 cents per pound for No. 28 gage.

Blue annealed sheets (10 cents per 100 pounds off), $1.50 per pound for No. 10 gage.

Steel billets, 4 inches square and larger, $21 per gross ton.

Sheet bars, $22 per gross ton.

All free on board Pittsburg, effective June 1, 1911, for shipment prior to Oct. 1.

TESTING SOCIETY

Will Hold Meetings at Atlantic City, June 27 to July 1.

The fourteenth annual meeting of the American Society for Testing Materials will be held at Atlantic City, N. J., June 27 to July 1. Among the interesting papers on the manufacture of iron and steel that will be presented are the following: "The Manufacture of Pure Irons in Open-Hearth Furnaces," by Allerton S. Cushman; "A Study of the Heat Treatment of Some Low Carbon Nickel Steels;" "A Comparison of the Properties of an Acid and Basic Open-Hearth Steel of Similar Composition," by Henry Fay; "Ductility in Rail Steel," by P. H. Dudley; " Recent Developments in Testing of Boiler Tubes," and "The Variation of Tensile Strength with the Percentage of Carbon in Iron Carbon Alloys," by C. R. Jones. The heat treatment of steel will be considered at one entire session, Wednesday, June 28, and on Thursday afternoon hardness tests of steel will be discussed. Subjects assigned to other meetings include a discussion of preservative coatings, Wednesday evening; cement and concrete, Thursday morning; bitumens, etc., Friday morning, and testing apparatus and methods Friday afternoon.

George K. Hooper and Arthur Falkenau announce their association as Hooper-Falkenau Engineering Co., successor to George K. Hooper, with offices at 165 Broadway, New York City. The company will continue designing and superintending erection of industrial plants, devising special machines, making expert investigations, etc., in which both gentlemen have had over 25 years' experience.

The Marion Shovel & Dredge Co., Marion, O., has taken over the Osgood Dredge Co., of Albany, N. Y.

ENGINEERS' MEETING

In Pittsburg Well Attended—Proceedings of Opening Sessions.

Pittsburg, May 31.

Early registration at the headquarters of the American Society of Mechanical Engineers, Hotel Schenley, Pittsburg, indicates that the 1911 summer meeting will be unusually well attended and fully equal to previous occasions. Tuesday evening was given over to an informal reception and reunion in the parlors of the Hotel Schenley. The presence of a large number of ladies added to the interest of the gathering.

The first professional session was held Wednesday morning, May 31, in the Lecture Hall of the Carnegie Institute, which afforded facilities unusually well adapted to the purpose. A brief business session preceded the reading and discussion of papers. The papers, Wednesday morning, were devoted to the mechanical engineering of cement manufacture. Walter S. Landis presented "Some Problems of the Cement Industry," and W. H. Mason and L. L. Griffiths respectively read papers on "Edison Roll Crushers," and "Power and Heat Distribution in Cement Mills". Supplementing the technical work of Wednesday morning, the Pittsburg plant of the Universal Portland Cement Co. was visited on Wednesday afternoon upon invitation of President E. M. Hagar.

The most important session to those interested in the iron and steel industry will be held Friday morning, June 2, when various phases of iron and steel works practice will be discussed. Papers will be read on steam-hydraulic forging presses, blowing engines, turbine turbo-compressors and allied subjects.

Both Tuesday and Wednesday a large number of the members visited the exhibit of the Foundry & Machine Exhibition Co. and showed great interest in the extensive display of foundry appliances at the Exposition buildings.

W. H. Hegmann, 911 Oliver building, Pittsburg, has been appointed agent for western Pennsylvania for Jno. Hy. Andrew & Co., Ltd., Sheffield, Eng., for Toledo high speed and carbon tool steels. He was formerly with the Crescent Steel Co. and Firth-Sterling Steel Co., as superintendent, having 24 years experience with tool steel mill practice in the Pittsburg district.

UNDER DOCTRINE

Of Reasonableness, Criminal Prosecution Impossible.

Washington, May 29.

Considerable light is thrown upon the cerebrations of a court during the trial of an anti-trust case by the report of the senate committee on judiciary, which disapproves the proposed amendment to the Sherman act providing for the insertion of "unreasonable" before the words, "restraint of trade." The committee takes issue with the supreme court in the opinion rendered in the Standard Oil case, and, in a very lengthy argument, sets forth that combinations tending to stifle competition are in themselves detrimental to the public good and that their reasonableness can neither be inquired into nor measured.

After many citations, the report comments that under the common law the doctrine and effect of all these cases is that any agreement or combination directly affecting the welfare of the public by stifling competition or breeding monopoly in trade or commerce is contrary to public policy and invalid, and that the courts in such cases will not undertake to measure the degree either of the stifling of competition or of the monopoly. In such cases, the reasonableness of the restraint is not measured or considered. The doctrine of reasonableness is only applied in cases of contracts which are limited as to time or place, or both, and where the interest of the parties is the principal thing at stake; but is not applied where the general public welfare is involved, nor where the express or implied purpose is to prevent competition in trade, or to create a monopoly.

Referring to another provision in the proposed amendment providing that "no prosecutions under the first six sections of the act shall be maintained for past offenses unless the contract or combination be in unreasonable restraint of trade, etc.", the committee remarks that the anti-trust act regards as a criminal offense violation of any of its sections, and provides a punishment both by fine and imprisonment. To inject, then, into the act the question of whether an agreement or combination be resonable or unreasonable would necessarily render the law indefinite and uncertain as a penal statute, and to that extent utterly nugatory and void. In short it would be tantamount to a repeal of that part of the act.

The committee elucidates this view by quoting a learned opinion of the late Justice Brewer, the substance of which is as follows: In order to constitute a crime, the overt act must be one of such nature that the party is able to know in advance whether or not it is criminal. The criminality of an act cannot depend upon whether a jury may think it is reasonable or unreasonable; there must be definiteness and certainty. No penal law can be sustained unless its mandates are so clearly expressed that any ordinary person can tell in advance just how much leeway he is allowed under its provisions. While the same technical objection does not apply to civil prosecutions, the committee on judiciary holds that the injection of the rule of reasonableness or unreasonableness into the anti-trust act would lead to great variableness and uncertainty in the enforcement of the law. The defense of "reasonable restraint" would be put forth in every appeal, and there would soon be as many precedents for "reasonableness" as there are cases, courts, judges and juries; where one court would convict, another would acquit.

Freight Rate Not Dependent on Coke Use

Freight rates on coke from the Pocahontas district in West Virginia to Chicago must not be made dependent upon the use to which the coke is put, according to a decision of the interstate commerce commission at Washington, last Friday. Blast furnace coke has had a rate of $2.35 and foundry coke $2.65 a ton. The commission directs that the difference must be resolved by July 25.

Inspecting Cayuna Properties.—Several members of the firm of Rogers, Brown & Co., together with officials of their furnace companies and associated interests, are making a personal inspection this week of ore properties on the Cuyuna range. D. B. Meacham, of Cincinnati, and M. C. Armour and E. L. Billingslea, of Chicago, members of the firm of Rogers, Brown & Co., are in the party, accompanied by David Croxton, president of the Cleveland Furnace Co., S. A. Kennedy, general manager of the Iroquois Iron Co., Chicago, and C. A. Stillman, assistant secretary of this company. The leader of this inspection party is Chester B. Tripp, general manager and chief engineer of the Rogers-Brown Ore Co., who has had personal charge of development work of the Rogers-Brown interests on this new range, which is expected to become a large factor in the production of Lake Superior ore.

COKING COAL LANDS

Purchased by Steel Corporation From Pittsburg Coal Co.

Negotiations have been closed whereby the United States Steel Corporation takes over the coking coal holdings of the Pittsburg Coal Co., according to statements made by those in a position to know, although official announcement has not been made by either side. The property includes 7,000 acres of valuable coking coal land in Fayette county, Pa., and about 1,000 ovens, which are operated by the Colonial Coke Co., a subsidiary of the Pittsburg Coal Co. The price paid is understood to have been between $2,500 and $3,000 an acre. This deal had been pending for some years and is understood to have been ratified at a meeting of the directors of the Pittsburg Coal Co. held in Pittsburg on May 24. The Colonial Coke Co. has three plants and has a monthly output of approximately 50,000 tons. The holdings will be turned over to and will be operated by the H. C. Frick Coke Co. It is expected that the sale of this property will strengthen the position of the merchant furnace coke producers, as the total output of this company has been sold in the open market. It is rumored, although the report has not been confirmed, that the United States Steel Corporation has also taken over some of the coking coal land of the Monongahela River Consolidated Coal & Coke Co.

Conference Arranged.—Final arrangements have been made by the Amalgamated Association of Iron, Steel and Tin Workers for the annual wage scale conference with the Western Bar Iron Association to be held at Cambridge Springs, Pa., beginning Tuesday, June 6. The association will ask for a renewal of the present wage scale. Manufacturers employing union labor will likely hold a preliminary meeting the latter part of this week to determine what action is to be taken at the joint conference. Arrangements are now being made by the Amalgamated Association for wage scale conferences with representatives of sheet and tin mills employing union labor.

John M. Riley, president of the Riley Shoe Mfg. Co., Columbus, O., on May 25 was named receiver for the Case Crane Co., also of Columbus, by a federal court. A West Virginia creditor with a note for $2,250 filed the application for a receiver. The company manufactures cranes and hoists.

April Exports Were the Heaviest on Record

Not Only Were Previous Tonnage Records Surpassed But Also Total Values of Iron and Steel

April exports of iron and steel were the largest on record. As will be seen by the table of monthly movement, the tonnage lines including scrap, pig iron, rolled iron and steel, wire, pipes and fittings, etc., amounted to 227,835 gross tons, or 12,164 tons in excess of exports in March, which had just made a new record by a jump of 60,000 tons from the total of last November. Prior to 1910 the best tonnage years had been 1906 and 1907, with 1,325,740 and 1,301,979 tons, respectively; but these April exports were at the rate of 2,700,000 tons a year. A new record in value of iron and steel exports was also made in April, with $24,917,056. The value includes the value of the tonnage lines, together with hardware, machinery, cutlery, etc.

IRON AND STEEL EXPORTS, GROSS TONS.

	April,		Ten months, ending April,	
	1910.	1911.	1910.	1911.
Scrap	1,764	9,673	10,821	43,032
Pig iron	11,757	12,188	63,103	138,790
Billets, sheet bars, etc.	168	27,417	49,133	146,198
Wire rods	4,562	1,651	20,608	14,805
Rails	19,732	54,182	308,670	322,257
Structural iron and steel	15,441	19,426	88,722	137,881
Bar iron	1,749	1,521	12,587	15,219
Steel bars	7,227	9,239	72,861	100,104
Sheets and plates	23,006	33,433	104,712	247,829
Tin plates	1,339	6,125	9,457	22,487
Barb wire	7,128	6,782	60,504	67,484
All other wire	8,032	14,687	64,776	89,994
Wire nails and spikes	3,895	6,288	29,097	43,637
Cut nails and spikes	535	696	7,418	8,374
All other, including tacks	433	1,765	6,481	10,150
Pipes and fittings	10,642	22,762	137,477	149,507
Totals	117,410	227,835	1,136,427	1,557,748

Taking the April exports at $24,900,000 in value, the tonnage lines, such as are given in detail in the tonnage table, comprised about $8,700,000; and the non-tonnage lines, including hardware, machinery, etc., $16,200,000. Thus the tonnage lines furnished about 35 per cent of the total value. In 1906 and 1907 they comprised 30 per cent and in 1910 31 per cent. The average monthly value of the tonnage lines in 1906-7 was $4,700,000; the similar figure for last April was $8,700,000, or 85 per cent more, while the actual tonnage increase was 107 per cent.

Increases in Detail.

It will be observed from the table of monthly tonnage that after a fairly steady monthly tonnage during the first 10 months of last year, averaging about 114,000 tons a month, there was a sudden increase in November, and the five months, November to March, inclusive, showed an average of over 150,000 tons a month, while April jumped to 227,835 tons. It will be interesting, therefore, to compare the April tonnages in detail with the average of the first 10 months of 1910. This comparison is shown by the following table, which gives the percentages of increase or decrease from the average of the first 10 months of 1910 to April just past:

Scrap	+ 90
Pig iron	+ 90
Billets, etc.	+ 460
Wire rods	— 20
Rails	+ 76
Structural	+ 109
Bar iron	+ 20
Steel bars	+ 27
Sheets and plates	+ 71
Tin plates	+ 550
Barb wire	+ 12
All other wire	+ 127
Wire nails	+ 115
Cut nails	— 5
Tacks, etc.	+ 173
Pipes and fittings	+ 66

Iron Ore Imports.

Imports of iron ore by months are shown in the following table:

	1909.	1910.	1911.
January	105,233	284,823	102,600
February	67,749	170,427	94,820
March	108,676	163,633	134,785
April	74,782	206,135	133,900
May	97,393	240,833	.....
June	124,714	193,415	.....
July	172,316	248,810	.....
August	209,855	282,949	.....
September	164,613	208,892	.....
October	179,505	219,571	.....
November	174,976	197,833	.....
December	222,609	173,710	.....
Totals	1,694,957	2,764,741	466,105

The sources of iron ore imports are shown in the following table, which gives the imports in April and in the four months of the year ending with April:

	April.	Four months.
Spain	11,973	60,843
Sweden	28,444	61,348
Canada	41	799
Newfoundland	12,430	12,430
Cuba	80,995	326,245
Other countries	17	4,440
Totals	133,900	466,105

IRON AND STEEL IMPORTS, GROSS

	April,		Ten months, ending April,	
	1910.	1911.	1910.	1911.
	TONS.			
Scrap	4,255	1,591	113,117	21,595
Pig iron	24,034	15,730	202,201	174,822
Billets, bars and steel, n. e. s.	5,308	1,649	30,912	34,163
Wire rods	2,092	1,423	11,866	15,401
Bar iron	4,968	1,236	25,658	24,650
Sheets and plates	1,422	216	5,964	3,257
Tin plates	5,619	547	56,467	38,675
Totals	47,698	22,392	446,185	312,563

Suit praying the appointment of a receiver for the Brown-Ketcham Iron Works, Indianapolis, was filed Saturday in an Indianapolis court by a preferred stockholder. The petition alleges that the company's liabilities amount to $1,100,000 and the assets amount to $375,000. The petitioner, Edward Pierson, declares that the company lost nearly $75,000 the first four months of the year. He asks that a receiver be named to wind up the affairs of the company. William H. Brown is president and John L. Ketcham is secretary and treasurer of the concern, which is one of the large structural steel erectors of the middle west.

EXPORTS OF TONNAGE LINES—GROSS TONS.

	1907.	1908.	1909.	1910.	1911.
January	102,630	74,353	70,089	118,652	152,144
February	87,912	81,773	84,860	110,224	150,704
March	112,787	96,681	94,522	124,980	215,671
April	132,790	93,285	100,904	117,921	227,835
May	91,543	64,041	109,977	135,306	.....
June	92,996	69,770	114,724	120,601	.....
July	122,240	86,796	100,680	128,060	.....
August	118,792	86,244	105,694	131,060	.....
September	114,819	76,732	97,392	118,737	.....
October	123,170	85,766	110,821	129,325	.....
November	116,309	71,130	115,943	154,725	.....
December	86,019	77,659	137,688	149,666	.....
Totals	1,301,979	964,242	1,243,467	1,535,698	746,354

VALUE OF IRON AND STEEL EXPORTS—TONNAGE AND NON-TONNAGE.

	1907.	1908.	1909.	1910.	1911.
January	$ 14,327,926	$ 13,468,058	$ 10,329,388	$ 14,513,394	$ 18,739,961
February	13,946,842	14,063,559	10,947,159	13,949,082	18,690,792
March	16,419,116	15,168,155	13,874,461	17,258,503	22,591,848
April	17,684,863	15,455,319	13,058,054	16,529,254	24,917,056
May	14,594,043	11,281,415	12,993,197	17,658,042	.....
June	17,226,259	11,677,944	13,779,736	16,503,204	.....
July	17,614,017	12,085,951	11,866,772	16,108,102	.....
August	17,587,181	12,058,561	14,136,219	17,628,538	.....
September	16,830,160	11,221,799	12,966,908	16,776,178	.....
October	18,786,750	11,505,063	14,249,598	17,452,085	.....
November	17,051,755	10,895,549	14,434,690	18,593,806	.....
December	14,997,869	12,231,741	15,075,183	18,300,710	.....
Totals	$197,060,781	$151,113,114	$147,680,331	$201,271,903	$ 84,939,657

RAIL BUYING

Is Expected to Improve—Latest Orders Placed.

New York, May 31. (By wire.)

The present outlook points to considerable rail buying over the summer months. One of the leading rail makers says: "Standard rail tonnage under consideration grows somewhat more interesting and indications point to the placing of a considerable tonnage during the summer months."

The Kansas City Southern tonnage, 14,000, is practically closed and is being divided equally between the Illinois Steel Co. and the Maryland Steel Co. The Illinois company has sold about 2,000 tons to the government reclamation service and 1,000 to the St. Joseph Valleys Railway Co. The Tennessee company has sold 1,100 to the Fernando & Gulf Railway. The Carnegie Steel Co. has sold 500 to the Wabash Terminal.

Iron and Steel Institute Re-Elects Officers

All the present officers of the American Iron and Steel Institute were re-elected at the annual meeting of the directors held at New York, May 24. They are as follows: President, E. H. Gary, chairman of the United States Steel Corporation; first vice president, Powell Stackhouse, Cambria Iron Co.; second vice president, Willis King, Jones & Laughlin Steel Co.; third vice president, C. M. Schwab, Bethlehem Steel Corporation; treasurer, Edward Bailey, Central Iron & Steel Co.; secretary, J. T. McCleary. The committee on welfare work made a very extended report, the most important feature of which was the announcement that it had selected Dr. Thomas Darlington for six years health commissioner of the city of New York, to take charge of the carrying out of the welfare plans of the committee in the mills. Dr. Darlington will establish his headquarters in a few days at the general offices of the Institute at 30 Church street, New York, and will direct the welfare work from that base.

Visitors Shown Through Coke Regions

The Jamison Coal & Coke Co., Pittsburg, on Friday, May 26, entertained a number of visitors and representatives of Rogers, Brown & Co., in attendance at the foundrymen's convention at two of its mining and coking properties at Greensburg, Pa. The party left Pittsburg on a special car over the Pennsylvania railroad, in charge of W. S. Johnston, general sales agent of the Jamison Coal & Coke Co., and W. G. Ireland. At Greensburg the party was met by a number of automobiles for the trip to the plants. The mines, washers and coke ovens of the Jamison company were inspected and lunch was served at the Crab Tree, Pa., plant, the party returning to Pittsburg at 2 o'clock in the afternoon. Rogers, Brown & Co. are the representatives of the Jamison Coal & Coke Co., and it was the friends and customers of the latter that were invited by the Jamison company. The trip was made by the following: N. C. Carr, Richmond, Ind.; W. S. Robb, Irvington, N. Y.; A. E. Proulx, Lowell, Mass.; H. P. McKimm, Boston, Mass.; A. J. O'Conner, Boston; J. Goostray, Boston; Fred H. Eastman, Chelsea, Mass.; James H. Scott, Wilmington, Del.; Neil C. Gibbons, Wilmington, Del.; M. E. Simpson, Minneapolis, Minn.; E. S. Sweet. Binghamton, N. Y.; George B. Foresman, Williamsport, Pa.; E. W. Anthony, Boston; E. H. Johnson, Trenton, N. J.; M. N. Norton, Troy, N. Y.; J. J. Davison, Watertown, N. Y.; Allen T. Ford, Bridgeport, Conn.; Arthur W. Gibbey, Boston; Charles Herbald, Cleveland; Ed. C. Bailey, Milford, Mass.; A. D. Ireson, Phillipsburg, N. J.; Arthur Smith, Phillipsburg, N. J.; N. W. Shed, Buffalo; H. B. B. Yergason, Cincinnati; Wm. P. Cheney, Pittsburg; H. S. Philson, Pittsburg; Otto Arlt, New York; R. W. Clark, New York; G. R. Sullivan, Philadelphia; H. C. Thomson, Philadelphia; F. J. Waldo, Buffalo; C. A. Wyatt, Boston, and F. E. Fitts, Boston.

Obituary

Austin Miller, master mechanic of the Richmond Iron Works, Richmond, Va., was instantly killed May 25, when thrown from an automobile with a companion. He removed to Richmond from Detroit about two years ago.

Simon Perkins, banker and manufacturer, died of heart failure May 27, at Sharon, Pa., aged 70. He was interested in West Middlesex and Sharpsville, Pa., blast furnaces at one time and was a director of the Erie railroad.

Dr. Luther W. Bahney, assistant professor of metallurgy at Leland Stanford university, has been appointed assistant professor of mining and metallurgy at Sheffield Scientific school, Yale university.

MOOSE MINES

Closed Indefinitely—Said to be General Understanding.

Toronto, May 30.

The Moose Mountain Iron mines at Sellwood, north of Sudbury, Ont., were closed down yesterday for an indefinite period, throwing 250 men out of employment. This action was taken as the result of a conference of the iron and steel interests of the United States and Canada held at New York, at which it was decided that there was an overproduction of ore and that the newer mines should be closed and production from the others limited. W. A. Jordan, superintendent of the Moose Mountain, attended the meeting and took action in accordance with its decision immediately on his return. Work will be commenced immediately on the company's new concentrating plant to cost $300,000 and the miners as far as possible will be employed in this work.

Personal

President E. C. Felton, of the Pennsylvania Steel Co., sailed May 24 for a trip to Europe.

L. L. Willard has taken a position as chief mechanical engineer for Allis-Chalmers Co., Uniontown, Pa.

Harry K. English, formerly with the General Electric Co., at Chicago, has been apointed secretary of the Ottumwa Iron Works, Ottumwa, Ia.

Charles Forsberg, aged 42 years, a metallurgical engineer, identified with the Westinghouse Machine Co., West Homestead, Pa., died at his home in Swissvale, Pa., May 25.

Daniel R. Reagan, of Terre Haute, Ind., has been elected president of the Hocking Valley Products Co., the proposed successor to the Columbus & Hocking Coal & Iron Co.

Andrew Carnegie, accompanied by his wife and daughter, sailed from New York, May 24, to spend the summer in Scotland. Mr. Carnegie will return in the fall and will then testify before the Stanley congressional committee now investigating the United States Steel Corporation, if his presence is desired.

Geo. K. Hamfeldt has resigned as general manager of the blast furnace departments and as consulting engineer of Les Petits Fils deF. de-Wendel & Cie., of Germany, effective July 1. Mr. Hamfeldt was for a number of years connected with the Carnegie Steel Co., Pittsburg, and later, as general manager of the Midland Steel Co., Pittsburg, Pa., built the plant at Midland, Pa.

New Steam Shovel for Mining Iron Ore

Description of Steam Shovel Equipped With a Wire Rope Hoist, Built by the American Locomotive Co.

Iron ore mining on the Lake Superior ranges and in other districts, where open pit mining is pursued, has been greatly facilitated in recent years by the use of the steam shovel for stripping and excavating. Probably in no service, where steam shovels are used, are the natural conditions more severe than those encountered in the stripping of the overburden from the Mesabi range deposits of the Lake Superior region. The material is glacial drift and it consists mainly of stiff, hard clay, full of boulders, ranging up to 100 cubic yards in size. Quicksand, rock and other similar materials are encountered. The shovels are operated in all seasons, regardless of weather conditions. Despite the natural obstacles encountered, the gradual evolution of new types of equipment has made the mechanical operations of mining in these regions, both increasingly powerful and efficient.

A new type of steam shovel adapted for iron mining, which has given good results on the Lake Superior and other ranges, has been developed by the American Locomotive Co., 30 Church street, New York. Following trials extending through 1908 and 1909, the Oliver Iron Mining Co. placed an order with the American Locomotive Co., for its entire 1910 power-mining shovel requirements, and this equipment is in service on the Oliver Co.'s operations at Chisholm, Colerane and Eveleth, Minn.

The most important departure from previous practice in the construction of this line of equipment, and the distinctive feature of this shovel consists of the use of the direct wire rope hoist in place of the indirect chain hoist. Direct wire rope hoisting has been successful in the operation of large dipper dredges and this feature has been incorporated in this shovel by the location of the main hoisting engines at the base of the boom. By this arrangement, direct-hoisting is accomplished by wire rope with only one large sheave located between the dipper and the engine, instead of the commonly used chain hoist with numerous sheaves. The internal friction of the chain, with the friction of several sheaves, is thus eliminated and it is claimed the efficiency of the machine is greatly increased. The use of a locomotive type of boiler of large steam capacity contributes to the increased efficiency of the shovel. This feature of construction has been made possible by the increased boiler space obtained by the removal of the hoisting engines from their usual positions on the car body.

The hoisting engines are bolted to the base of the boom and occupy only a small space. The friction clutch and steam-operating ram arrangement is of a special type. The friction bands are of large diameter and width and are so designed that each provides sufficient power to hoist, or to hold the dipper in the event of an accident. By the use of levers operating the ram cylinder valve, sufficient compression at either end of the stroke is obtained to cushion the piston and to prevent slamming. The lowering of the dipper is controlled without an additional foot brake treadle, the ram being operated only by means of a hand lever. The hoisting drum is of large diameter and is driven by two steel, machine-cut gears. The steel hoisting rope consists of two parallel parts, equalized around a thimble in the dipper, each portion thus bearing half the load. The rope is so attached to the drum that is can be readily removed and replaced.

The entire back of the dipper is a single steel casting with lugs to receive the dipper arm, hinges for doors and other connections cast integral. The hoisting rope is attached directly to the back of the dipper in such a manner that the lines of force meet at a point in the plane of the resistance or in line with the strain applied to the teeth. The advantages claimed for this arrangement are the elimination of the bending moment on the dipper; the full mouth of the bucket is free for large boulders and for complete filling, and the dipper is stronger, lighter and has fewer parts. The A-frame is formed of steel bars, having forged pin connections at the feet and a cast steel head. It is stepped upon the ends of the jack-arm truss so as to form a continuation of the latter and completes a perfect truss through the jack arm tension bar and its connection with the central members of the car body. Intersection of the three strains at one point is secured by this design. The boom has a straight taper with the maximum sec-

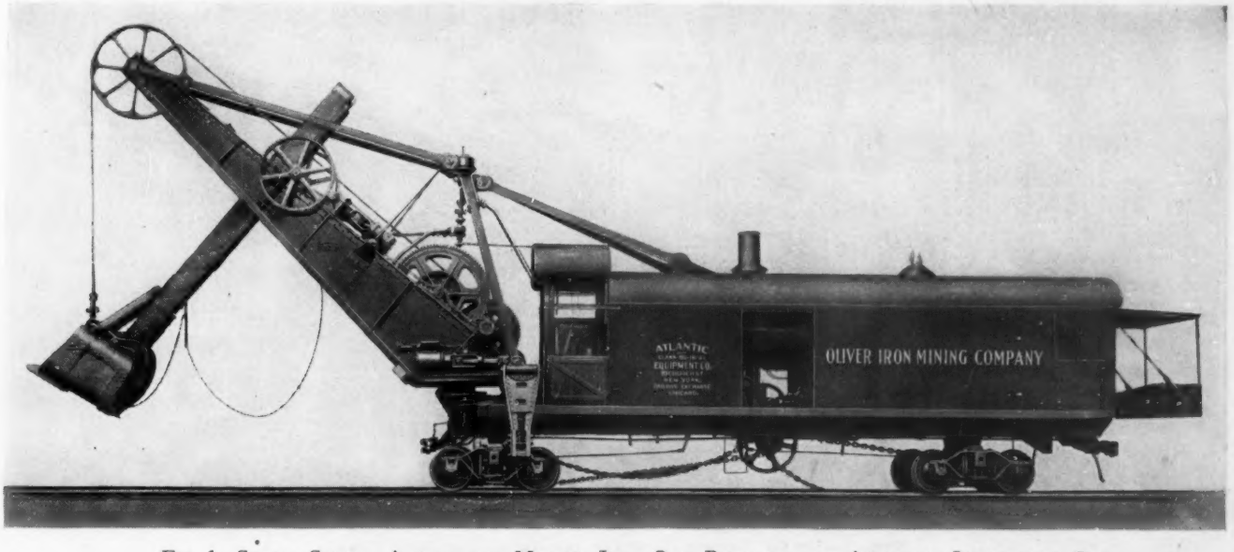


FIG. 1—STEAM SHOVEL ADAPTED FOR MINING IRON ORE, BUILT BY THE AMERICAN LOCOMOTIVE CO.

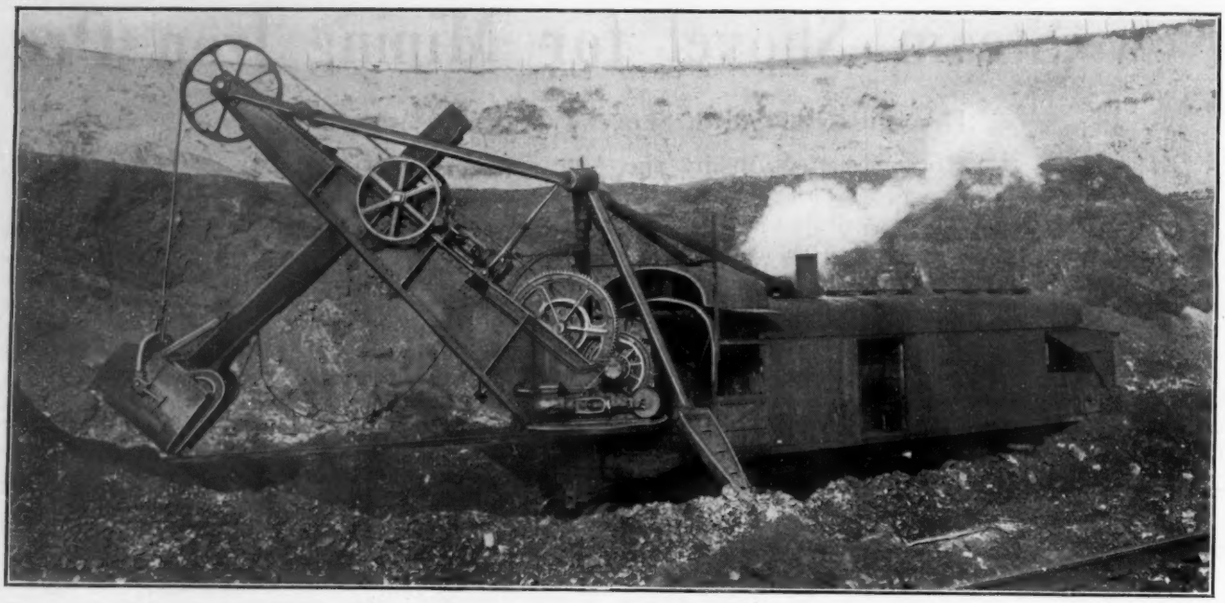


FIG. 2—STEAM SHOVEL EXCAVATING IRON ORE IN OPEN PIT MINE OF THE OLIVER IRON MINING CO.

tion at the base and the metal is so distributed as to give the greatest strength where the strain is severest, together with the least weight at the point of greatest motion.

Because of the space available on the car body, a large boiler capacity is provided. The outside diameter of the boiler is 52 inches and the length 21 feet 4 inches. The fire box is 46 inches wide and 66 inches long. The boiler contains 96 tubes, 2¼ inches in diameter and 12 feet 11½ inches long. The total heating surface is 865.7 square feet, including 753.5 square feet in the tubes and 112.2 square feet in the fire box. The grate area is 21.2 square feet. Water is fed to the boiler by an injector and feed pump. When specified, the shovels are equipped with siphon and suction hose. Because of the large capacity of the boiler, water may be taken through the siphon when the machine is in operation. The car body is formed of extra heavy steel beams. The two central members, upon which all the severe strains and mechinery attachments are concentrated, are heavy I-beam sections, placed close together.

The liberal use of cast steel is one of the notable features of the construction of this shovel. This material is used in the trunnions, point sheave, dipper hinges and back, dipper arm racks, base plates and other parts subjected to heavy strain. On either side of the boiler and connected by an equalizing pipe are water tanks with a combined capacity of 2,000 gallons. A coal platform with a steel floor is attached to and projects from the rear of the shovel. The platform is built of steel and is hinged up when not in use.

This shovel has an 80,000- pound pull, a clear height of lift of 18 feet 6 inches and is equipped with a dipper of from 3 to 5 cubic yards capacity. In average material, this machine will handle a 4½ or 5-cubic yard dipper. For excavating a harder material a 3 to 3½-cubic yard dipper is usually employed. The width of the cut at an 8-foot elevation is 64 feet. The working speed per minute is three to five dippers.

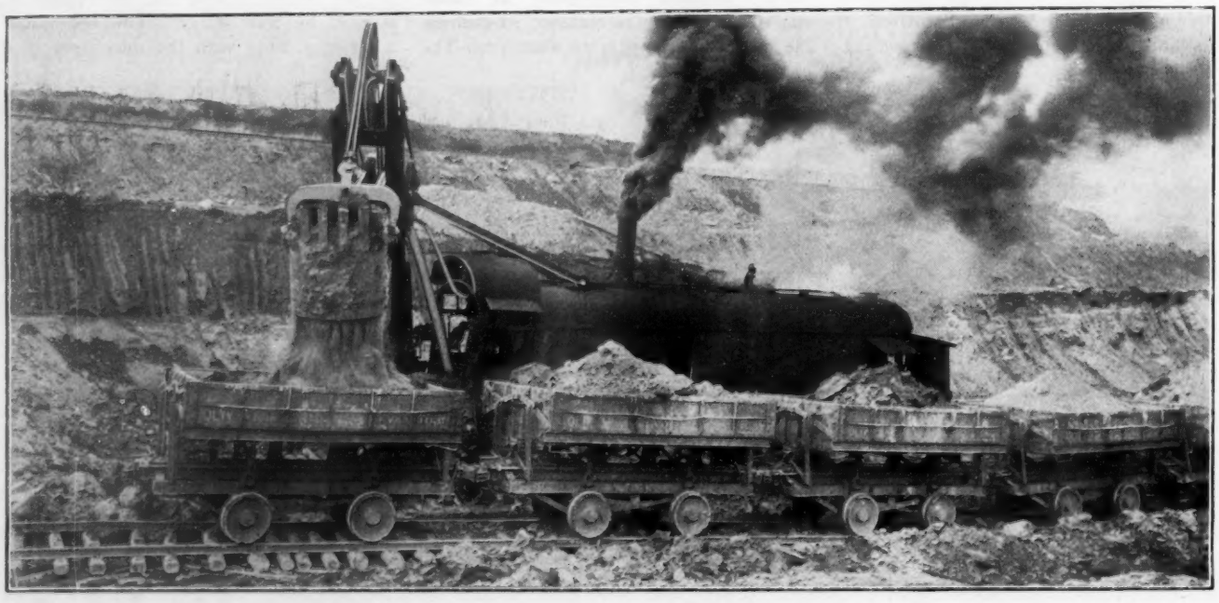


FIG. 3—STEAM SHOVEL DISCHARGING IRON ORE INTO CARS

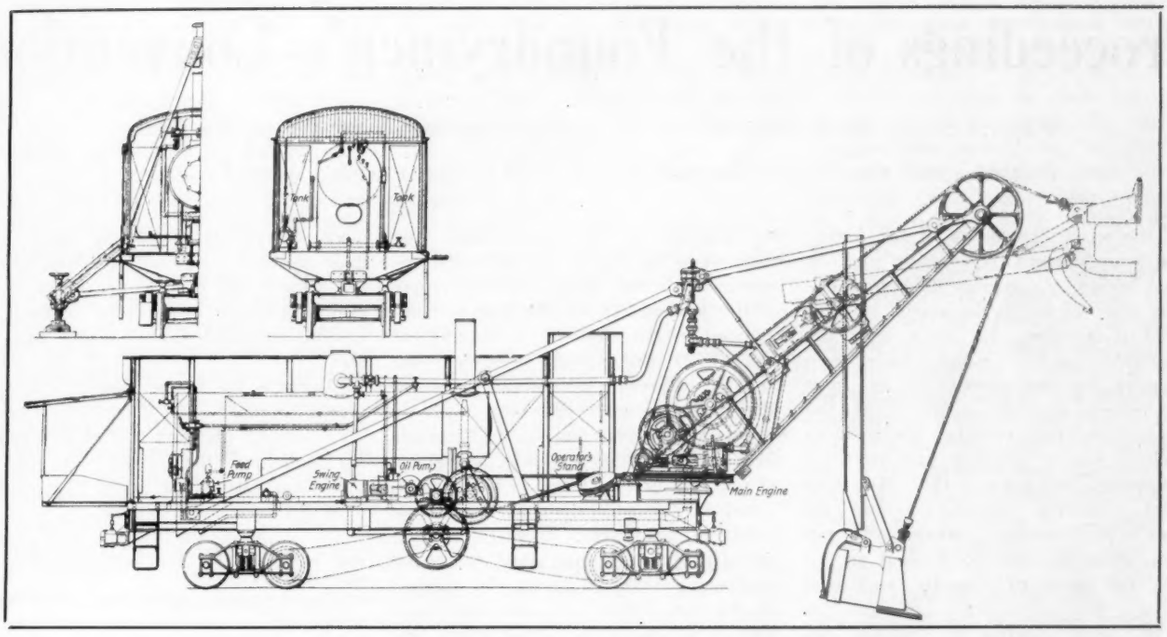


FIG. 4—PART FRONT, END AND SIDE ELEVATION OF STEAM SHOVEL

The height of the A-frame lowered is 15 feet and at the extreme limit, 21 feet 8 inches. The total wheel base is 36 feet. The car body is 42 feet long and 10 feet wide, and the gage of track 4 feet 8½ inches. Bituminous coal is used and the bunker capacity is 8,800 pounds. The weight of the shovel is 203,000 pounds.

In addition to this type, this steam shovel is manufactured in various sizes, covering a wide range of requirements in excavating operations from service in open mining, quarries and sand pits to other classes of work, where a dipper of 1¼ cubic yards capacity is of sufficient size to meet the requirements. The various parts of the hoisting friction ram and clutch, illustrated in Fig. 5, are numerically indicated herewith:

1.—Ram cylinder.
2.—Ram cylinder head.
3.—Ram cylinder steam chest.
4.—Ram cylinder frame.
5.—Ram piston.
6.—Ram piston rings.
7.—Ram piston rod.
8.—Ram crosshead (top).
9.—Ram crosshead (bottom).
10.—Ram crosshead pin.
11.—Ram spindle.
12.—Ram valve.
13.—Ram valve stem.
14.—Ram cylinder lever.
15.—Ram cylinder lever link.
16.—Ram crosshead lever.
17.—Ram valve stem link.
18.—Ram cord rod link.
19.—Ram cord rod.
20.—Hoisting friction shaft.
21.—Hoisting friction pinion.
22.—Hoisting friction gear.
23.—Hoisting friction band (L).
24.—Hoisting friction band (R).
25.—Hoisting friction band lug.
26.—Hoisting friction band hinge.
27.—Hoisting friction band block.
28.—Hoisting friction band turnbuckle.
29.—Hoisting friction toggle lever.
30.—Hoisting friction toggle lever block.
31.—Hoisting friction toggle lever strut.
32.—Hoisting friction toggle lever spring.

The Chicago Portland Cement Co., Chicago, has issued a 6 x 9-inch, 68-page booklet which describes the details of the manufacture of cement. The work is entitled "From the Raw to the Finished Product". A large number of views illustrate the different successive stages of the process of cement manufacture.

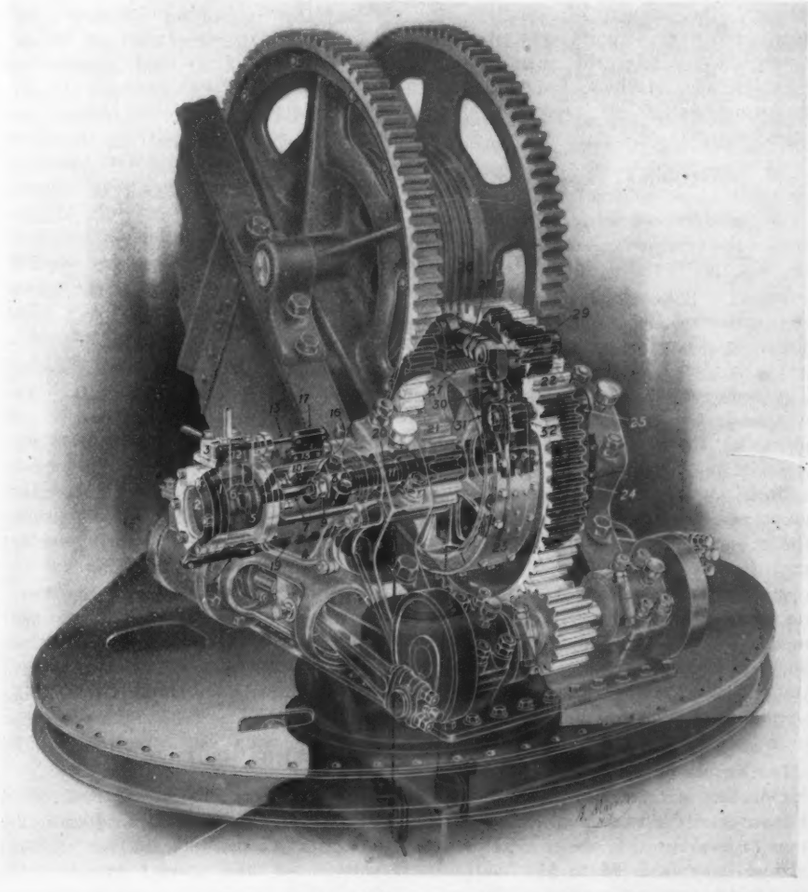


FIG. 5—HOISTING FRICTION RAM AND CLUTCH.

Proceedings of the Foundrymen's Convention

Report of the Professional Sessions of the American Foundrymen's Association and the Brass Founders — Entertainment and Other Features

If the recent convention of the American Foundrymen's Association and its allied bodies, which was held at Pittsburg, May 23 to 26, be compared with the first meeting, 15 years ago, the remarkable strides which have been made in foundry practice in the past few years, become evident. At the time of the first meeting, the molding machine was a curiosity and electrical equipment unknown; the American Brass Founders' Association and the Associated Foundry Foremen did not exist, while the idea of holding an annual exhibition of foundry appliances had not been conceived. The character of the recent meeting in Pittsburg was fully up to the standard which has been set in the past few years. The American Foundrymen's Association, the Brass Founders' Association and the Associated Foundry Foremen held professional sessions, at which a large number of interesting papers were presented, and the amount of attention devoted to steel foundry practice was noteworthy. Under the auspices of the Foundry and Machine Exhibition Co., the usual exhibit of modern foundry equipment was held.

Opening Session.

The professional sessions of the American Foundrymen's Association opened at 10 a. m., Tuesday, Major Joseph T. Speer presiding. Addresses of welcome were extended by representatives of the Pittsburg Chamber of Commerce and on behalf of Mayor Wm. A. Magee. The reply to the addresses of welcome was made by A. E. Howell, vice president of the American Foundrymen's Association. In a brief presidential address, Major Speer pointed out the great progress which has been made in the science and art of founding in the past few years, due largely to the cooperation and interchange of information among foundrymen. He also commented on the prevailing unsatisfactory business conditions in the foundry trade and expressed the opinion that normal activity would return in the near future.

In his annual report, Dr. Richard Moldenke, secretary of the American Foundrymen's Association, called attention to the fact that the increase in the annual dues from $5 to $10 has placed the society on a sound financial basis, although the membership has been slightly reduced. For the first time in the history of the association, the transactions have been sent to the membership in bound form and the report of the proceedings of the Detroit convention is recorded in a volume of nearly 500 pages. In reviewing the work of the year, Dr. Moldenke stated that much progress has been made in continuous melting and in the development of the permanent mold, and pointed out that great interest is being manifested in the utilization of waste materials in foundries. Progress was reported on the molding sand tests that are being conducted under the auspices of the association and thus far more than 1,500 separate tests have been made of 80-odd molding sands. The Ohio State Geological Survey has made a request that its 850 tests of molding sands be added to the report of the investigations of the American Foundrymen's Association. As it will require some time to digest and complete the work, a report of this investigation will be issued in the near future. The secretary announced a total membership of 692, but this will probably be reduced slightly when the present arrangement with the individual members of the Foundry and Manufacturers' Supply Association, which was recently dissolved, is terminated on July 1. The total receipts for the year amounted to $5,085.50, and with interest and the balance at the time of the Detroit convention, the receipts totalled $5,394.21. The balance on hand on May 20 was $1,541.95.

Dr. Moldenke read a telegram announcing the death of W. W. Sly, of Cleveland, and a committee was appointed to draw up appropriate resolutions on the death of Mr. Sly and also Albert N. Spencer, who were prominent members of the various foundrymen's organizations.

Brief reports were made at the Tuesday morning session by the president and secretary of the American Brass Founders' Association, which showed that this organization is in a flourishing condition. The secretary reported that the membership is increasing rapidly and now totals 287.

S. G. Walker, Providence, R. I., read a paper on "Low Cost Insurance for Foundries", which pointed out the advantages of the mutual system. He stated that mutual fire insurance companies are able to operate more economically than stock companies and are more careful in inspecting risks and have avoided congested districts where the danger of fire is multiplied. He also stated that the moral hazard in mutual insurance is practically negligible.

Ellsworth M. Taylor, New York, presented a paper on "Production Costs". Mr. Taylor's paper contained a formula for obtaining the actual cost of an individual casting, or group of castings. This formula is as follows:

(1) Multiply the weight of the casting or class by the cost of the net metals consumed.
(2) Add the cost of the direct labor used.
(3) Multiply the weight by the per pound unit, covering all indirect costs to be distributed on a basis of weight of good castings. These items are: Cupola cost, molding supplies, flask costs, core supplies and expenses, and all items of similar nature.
(4) Multiply the direct labor by the percentage unit covering all indirect costs to be distributed as a percentage of direct labor. These items are: Office and clerical charges; foremen, etc.; miscellaneous foundry labor and expenses; rent, and all items of a similar nature.
(5) Total the above amounts.
(6) Add a proper proportion of selling expenses.

The total is the gross cost of the individual casting or class.

Continuing, Mr. Taylor stated that the greatest commercial weakness of the foundry industry today is a lack of appreciation of sound business methods. Competing foundries pay practically the same amount for labor and materials, but are woefully inaccurate in computing their overhead, or burden charges, often neglecting them entirely. For this reason the prices on a given set of castings will often vary over 200 per cent among five or six shops in the same town. Indifference to actual cost factors is responsible for these varying prices. It is necessary for the successful foundryman to watch his indirect expense continually and to have some accurate way of computing it.

Standard Test Bar for Cast Iron.

Dr. Richard Moldenke presented a "Memorandum on Standard Test Bars for Cast Iron", in which he called attention to the discussion of the arbitration test bar at the Copenhagen Congress of the International Society for Testing Materials. This test bar is 1¼ inches in diameter and 14 inches long, and is broken transversely on supports

12 inches apart. The comparison of practice showed, that so far as the diameter of the bar is concerned, there is a general accord, foundrymen and users of castings having finally concluded that as large a bar as can conveniently be handled on ordinary testing machines is the one to adopt. Germany, Italy and the United States have adopted the 1¼-inch bar and while England is favorably inclined, no official action has yet been taken on the subject. There also seems to be unanimity of opinion as to the manner of casting test bars on end in dry sand, although in Germany these bars are cast from the bottom. The radical difference in the several standards seems to lie entirely in the length of the bar. In the United States, the bar is 12 inches between supports, in Germany the bar is almost 2 feet long, while in Italy the length of the bar between supports is only 6 inches. It was, therefore, suggested at the Copenhagen Congress that a series of tests be made in the several countries interested, with bars ranging from 6 to 24 inches between supports and from the results obtained, the length be selected which will give the best general values. At the 1910 meeting of the American Society for Testing Materials, the results of a series of tests made in this country was reported by Walter Wood, of R. D. Wood & Co. Three series of tests were made on an average of nine bars each and the modulus of rupture of the bars tested on a 12-inch span was 45,930 pounds per square inch; 18-inch span, 44,570 pounds per square inch, and 24-inch span, 42,800 pounds per square inch. This indicates a steady downward progression of the modulus of rupture for cast iron, as the span increases.

Other Tests.

Ten sets of four bars, 1¼ inches in diameter and 26 inches long, were cast and these were broken on supports 14, 16, 18 and 20 inches apart. The composition of the metal follows: Silicon, 1.90 per cent; sulphur, 0.08 per cent; phosphorus, 0.75 per cent; manganese, 0.65 per cent; combined carbon, 0.55 per cent; graphitic carbon, 3.10 per cent, and total carbon, 3.65 per cent. The modulus of rupture of the 14-inch bar was 44,000 pounds per square inch; 16-inch bar, 43,800 pounds per square inch; 18-inch bar, 43,800 pounds per square inch and the 20-inch bar, 44,100 pounds per square inch. The difficulty, however, seems to lie in the fact that no tests of spans as low as 6 inches are available. With such results it would be possible to plot a curve, showing the relation of the span to the modulus of rupture of the material, the turning point being found when too great a stiffness and consequent high results, change to too great a weakness or possible lack of sensitiveness on the part of the test on the other side. This point, when found for the several classes of iron, would be the desirable length of the span for the standard test. This series of tests should be extended by including those made on bars of smaller spans.

A partial report of the investigations of the committee on molding sand data was read by the secretary, and a method of analyzing molding sand on a rational and standard basis was presented. Other papers read at this session, but only briefly discussed, included "The Efficiency Movement in the Foundry", by C. E. Knoeppel, and "Weak Points of Cost Systems", by S. E. Nold.

Cupola Practice.

The Tuesday afternoon session was opened by two papers on "Cupola Practice", by P. Munnoch and R. H. Palmer. Mr. Palmer's paper contained a detailed explanation of a system of cupola operation employed in a large Ohio foundry. He contended that the height of the tuyeres above the sand bottom should be governed by the class of castings produced and the facilities afforded for handling the melted iron. In a foundry producing light castings, where the iron is handled quickly, lower tuyeres can be used than where heavier castings are produced. After the cupola is charged, at least 30 minutes should elapse before turning on the blast. This gives the charges a chance to become heated so that the cupola starts melting hot iron and will continue to do so during the heat. Mr. Palmer stated that each cupola has its individual peculiarities and is a law unto itself.

The discussion of the papers on "Cupola Practice" was spirited and extended. In answer to a question regarding the cause of a varying melting ratio, Mr. Palmer stated that this ratio depends on the size of the cupola, the coke used, the kind of metal melted and numerous other factors. The bed charge should be constant regardless of the amount of iron charged. It is better to have the bed too high than too low; to some extent the proper height of the bed may be determined by the time required to obtain the first iron, which should be from 10 to 12 minutes.

Two Rows of Tuyeres.

In answer to a question regarding the effect of atmospheric conditions on cupola operations, Mr. Palmer stated that he was able to melt faster in wet weather than in dry. He did not believe this was due to tighter belts on the blower during damp weather because the same phenomenon was observed with direct-connected, motor-driven blowers.

Mr. Palmer said he used two rows of tuyeres in his cupola, but advised plugging the upper row, if possible, when melting a relatively small amount of metal. This opinion was confirmed by other speakers. Mr. Palmer stated that his 48-inch cupola requires more limestone proportionately than the 72-inch furnace. Mr. Brown asked if the first ton of iron from the cupola was good enough for high-grade castings. He said that in his experience in making textile machinery it had been found advisable to pour the first two or three tons of a heat into pigs. The advisability of this practice was questioned by other speakers, although Mr. Palmer stated that it might be advisable to draw off and pig the first 400 or 500 pounds.

Dr. Moldenke stated that the most important factor in cupola practice is to get the iron started at the right time in from 8 to 10 minutes after turning on the blast. In order to do this, it is necessary to have the bed charge properly proportioned. He condemned the practice of putting an extra heavy charge of iron on the bed charge of coke and strongly recommended light, evenly distributed charges throughout, decreasing the amount of coke gradually toward the end of the heat. Only the 6 inches of coke on the top of the bed does any work in melting iron and in order to get the greatest efficiency, the coke charges must be so adjusted that the iron will be melted at the hottest point in the cupola.

Briquetting Metal Borings.

An exhaustive paper on "The Briquetting of Metal Borings" was presented by Dr. Richard Moldenke. This paper described a process developed in Germany for compressing borings and turnings by the use of pressure alone without binders. Cylindrical briquettes, about 6 inches in diameter and 8 inches long, are made. The briquettes are formed in a hydraulic press of special design, provided with intensifiers, which increase the pump pressure of 2,500 pounds per square inch to a final pressure of 35,000 pounds per square inch. Usually the briquettes are compressed twice—first to a low pressure and finally to 35,000 pounds. Sufficient time is allowed in the process to let all the air escape from the briquette. This is a very important feature, since if the briquettes are made rapidly and contain air they will explode when heated to high temperatures. There are ten plants manufacturing these briquettes in Europe; each one cost about $35,000 to erect and over $200,000 was spent in

perfecting the process. The plants are provided with receiving bins, which keep the chips received from various manufacturers separate, so that each shop gets back its own scrap in the form of briquettes. The briquettes are made so dense that they may be heated and drop-forged without melting. When using briquettes alone in a cupola, the melting loss is about 8 per cent, but the best practice is to charge only 5 to 15 per cent of the metal in this form. Under these conditions the melting loss is lowered to 3½ per cent. There are some drawbacks in using briquetted borings. The silicon in the castings is lowered more than usual; the total carbon decreases and the sulphur increases. In spite of these facts, the briquettes are sold in Germany at pig iron prices. The cost of manufacture, excluding royalties, is about 60 cents per ton.

Charging Cupolas.

"Mechanical Charging of Cupolas" was the subject of a paper by G. R. Brandon, Harvey, Ill. It described the various types of charging machines in modern foundries and pointed out the conditions under which they are used most efficiently. The paper also described correct methods for laying out the stock yard and for handling the stock from the yard to the cupola. In discussing the paper, Dr. Richard Moldenke stated that the cupola charging machine is apt to make trouble for the foundryman unless great care is used to keep the charges level. He said the machine ought to be so designed that level charges would be placed in the cupola automatically and described a method of doing this, using a bucket with a drop bottom.

Heated Foundry Mixers.

In a paper on "Progress in Heated Foundry Mixers", J. B. Nau, New York, discussed the use of mixers as intermediary receptacles placed between the blast furnace and the foundry, into which iron from the blast furnace could be poured and kept liquid for any desired length of time. While in the mixer, the quality of iron can be corrected by suitable additions of either liquid or solid pig iron, or by additions of wrought iron scrap, should it be desired to obtain a metal with lower carbon content. From this mixer, the metal is withdrawn whenever needed in the foundry. Its use is more especially recommended in pipe foundries.

The paper on "Titanium in Iron", presented by Chas. V. Slocum, is given in abstract as follows:

The manufacture of titanium in the form of an alloy was undertaken on a commercial scale in 1907 and the results in the early tests were considered for a time the basis upon which it will be necessary to place this material on the market. After repeated trial and experiments, different results were obtained and it became necessary to modify these original ideas in accordance with these developments. Two-tenths of 1 per cent of this alloy, which contains only 0.02 per cent of metallic titanium, is frequently sufficient for cleaning iron of impurities remaining in the metal after the ordinary fluorspar has accomplished all that can be done in this direction. The effect of small fractions of a percentage of titanium in iron is to increase the fluidity and at the same time to make the metal more homogeneous, so that the castings are closer grained and are free from pin holes, gas bubbles and blow-holes. The shrinkage in treated iron is less than in an untreated casting. It has also been found that the metal treated with titanium remains hot longer than untreated, thereby allowing more time for the gases to escape from the iron in the mold. When the titanium alloy is added in the cupola, it does not affect the lining unless large percentages are used and when these large percentages are necessary, it is advisable to add the alloy in the ladle, taking the necessary precautions to prevent the alloy from coming into contact with the slag. In a recent trial of titanium alloy in a cupola with a mixture of burnt iron stove plate, etc., in a large foundry in the Pittsburg district, one-half of 1 per cent of the alloy was used with one-half of 1 per cent of ferro-manganese of the usual 80 per cent grade. This only demonstrated the fact that the poorest mixture may be brought to good normal iron by the use of this alloy. The average breaking strain of the test bars cast from this heat was 3,100 pounds per square inch, with an average deflection of 0.146 inch.

Handling Defective Castings.

An interesting paper, entitled "Defective Castings and How to Handle Them", read by John M. Perkins, is presented, briefly, herewith:

This subject is of vital importance to every foundry proprietor and all engaged in the manufacture of castings. The problem of reducing the percentage of defective castings should first be considered in the draughting room, as there are many more details, seemingly of no importance to the engineer, which should be considered from the foundryman's viewpoint. The patternmaker should consult with the foundryman before making his patterns and after the pattern has been completed and a small casting has been made and checked, it is up to the foundry to consider the question of production. The foundryman should consult with the coremaker, the molder and the cleaning room foreman as to the best method of procedure.

If a foundry is operated on a piecework basis and each molder guarantees his work, the question of defective castings is much simplified. In other shops in which there is a strong opposition to piecework, a given day's work is established and a monthly bonus is paid for low percentages of defective work. In one of the largest foundries in the country a bonus of $15 per month is paid to molders whose work shows less than 2 per cent loss; $12 for less than 3 per cent loss; $10 for less than 4 per cent loss; $7.50 for less than 5 per cent loss, and $3.75 for less than 6 per cent loss. The foremen in the shop participate in the bonus system, their bonus being taken from an average of all the molders' percentages. In many shops there are *trouble men,* who look over all defective castings and ferret out causes for defects. These men are indispensable, especially in a large foundry, where small defects are often permitted to continue, sometimes indefinitely, without being remedied. There are five factors essential to a lower percentage of bad castings, as follows:

First.—A sand from which good castings can be made continuously.

Second.—The combined ideas of all interested in the making of a casting, so as to obtain the best equipment for its production.

Third.—A substantial incentive offered for good work.

Fourth.—Having made a good casting, to insure its shipment in as good condition as when it left the foundry.

Fifth.—A clean, well-equipped shop.

Molding Machine Practice.

The Tuesday afternoon session closed with the presentation of two papers on molding machine practice, by E. H. Mumford and John Alexander. Very briefly, Mr. Mumford's paper is as follows:

It is almost a pity that foundrymen, like railroads, have not an Interstate Commerce Commission to decide for them what is worthy of their notice and what is not. Such a commission would be as valuable to foundrymen who are now spending large sums on equipment as are consulting chemists or plant engineers. Its advice would be as valuable to the sellers of molding machines as to the purchasers thereof, inasmuch as when in its opinion a new machine was worth trying, it would be tried on their recommendation in one or more foundries, adapted to it and willing to make the trial, as to the result of which trial others would be advised, and the parallel selling, and too often parallel failures, rejections, and eventual burials of devices with cost of repeated construction, transportation, foundations and operation would be saved. Probably at least nine-tenths of the losses involved would be saved to our allied industries.

At present, this identical kind of experimentation is being carried out independently and often simultaneously by many of our largest corporations, each for its own information. Such a commission might easily include in its functions the advice of expert patent counsel, exactly as do the railroads, to avoid risk of law suit, and most valuable of all, to prevent idle threats of patent suits based on vindictive competition, retarding improvements and intimidating worthy inventors.

John Alexander's paper on "Machine versus Hand-Molding" pointed out the many advantages of the former method over the latter. Some interesting notes on the history of molding machine practice were contained in the paper. In 1860, some foundrymen were using squeezers, and in 1864, machines had

been invented for molding gear wheels. In 1869, the first patent was granted for jarring machines.

Permanent Molds.

The Wednesday morning session opened with an exhaustive paper on "Permanent Molds", by Edgar A. Custer. The author stated that molding in sand and in permanent molds are as far apart as the poles, and then described fully the characteristics of castings made by the latter method. The permanent mold is possible because the iron does not chill until some time after it sets and is always removed from the mold while hot and before chilling commences. To use permanent molds, continuous melting is necessary, and the paper described the process of continuous melting in cupolas producing from one to five tons per hour. The permanent mold is not a cure-all for all foundry ills. Manganese and sulphur should be avoided in the mixture, since high manganese makes the castings hard and brittle and sulphur has the same effect. Between 2 and 3 per cent, the amount of silicon has no effect on the hardness of the iron, since it is not given time to cause the precipitation of graphitic carbon. An ideal iron for permanent molds would analyze as follows:

	Per cent.
Silicon	2.25
Sulphur	0.04 or less
Manganese	0.04 or less
Total carbon	4.00

The discussion of this paper brought out the fact that thin or thick castings are taken out of the mold in practically the same time, but in the case of thick castings only the outer shell has hardened. When permanent mold castings are plunged into cold water at a yellow heat, the combined carbon is raised and the grain made finer, but the iron is not whitened. Plunging in oil merely closes the grain. High sulphur or manganese generally makes it hard to prevent blow-holes and shot are produced in the castings by the splashing due to careless pouring.

A paper entitled "The Foundry at Close Range", by B. D. Fuller, which will be published in an early issue of THE IRON TRADE REVIEW, described many details in connection with efficient foundry management.

Core Room Practice.

Archie M. Loudon read a paper on "Coremaking and Core Machines," describing particularly machines for making large cores. An abstract of a paper on "Core Room Practice", presented by F. A. Coleman, follows:

This paper is written from the engineer's point of view and deals with the tools and equipment for the use of the coremaker. The equipment necessary for coremaking consists of devices for preparing the core sands, making the cores, baking the cores and space for the storage of sand, fuel and the cores. The essential feature of preparing a core mixture is to rub the binder all over each particle of the core sand to thoroughly incorporate the binder and sand into a homogeneous mass. The mere sifting and riddling of the ingredients is not real mixing, nor is it efficient or economical as to binder. The use of old sand is a great economy and every foundry should use as much of it as possible. The jar-ramming molding machine had not been long in use before the keen-eyed coremaker saw its possibilities and now there are several forms of machines on the market of the jar-ramming type. The roll-over molding machine is also being adapted to the making of different cores, as well as stripping plate and drop pattern molding machines.

Core Ovens.

Core ovens should be designed for two classes of work, namely, for baking bench or small cores and floor or large cores. Ovens for small cores are divided into two classes, portable and stationary. The continuous core oven handles only small cores and while it has a limited field, it should be valuable under the special conditions permitting its use. For large cores the car oven is generally used. It consists of a brick chamber containing one or more tracks and a heating system. The tracks are always important in every car oven and as the loads increase, the greater is the need for good tracks.

Where the core department can be laid out so as to locate the ovens in a room apart from the coremakers, better results are obtained, both as to quantity and quality of output. The arrangement of the benches, ovens and racks for green sand cores depends somewhat upon the system of distributing the sand and of handling the green cores from the bench to the ovens. The core room should be so arranged that the finished cores can be unloaded under the main bay cranes, either by running the cars out on the main floor in the foundry, or by swinging the cores from the core car by jib cranes onto the main foundry floor.

Pyrometry.

S. H. Stupakoff read a paper on "Recent Developments in Pyrometry", which discussed the selection and use of pyrometers for foundry service. The selection of the proper protecting tubes is one of the most important factors in applied pyrometry. For temperatures up to 2,500 degrees, quartz-protected pyrometers are useful since quartz tubes can be plunged into cold water at this temperature without cracking. Pyrometers based on the thermo-electric principle are also very useful.

The recovery of core sand in a sand-washing machine, built by the Osborn Mfg. Co., Cleveland, was discussed in a paper entitled "Waste Sands of the Foundry", read by S. A. Capron.

The Wednesday afternoon session was devoted to a discussion of steel foundry practice and opened with two excellent papers on open-hearth practice, by Walter McGregor and R. E. Bull. Mr. Bull's paper was published in THE IRON TRADE REVIEW, May 25. Mr. McGregor took up in detail the important points to be observed in manufacturing quantities of steel castings with the use of the small open-hearth. Mr. Bull described exhaustively the operation of modern, oil-burning, open-hearth furnaces.

The discussion of these two papers was extensive and a number of important points were brought out. The suggestion was made that thermit be used at the end of the heat to warm up the residue of the bath and add silicon, but Mr. Bull stated that although the thermit would increase the silicon it is not possible to avoid other deteriorating changes in the composition of the last few hundred pounds of metal poured. This is caused by the slag in the ladle absorbing the manganese and silicon from the steel and disturbing its chemical composition. A thin slag under two inches thick, apparently does little harm, but slags between two and six inches thick, which are usually found in practice, have a very bad effect. In order to overcome this difficulty and get rid of the slag an Illinois steel foundry is experimenting with the use of carbo, a form of crude carbon obtained from petroleum. The carbo is introduced in the ladle in the ratio of about 20 pounds to 25 tons of steel and causes the slag to boil over the edge. It also raises the carbon in the steel from one to two points. In making small castings by the open-hearth process, the use of small heats was advocated in order to prevent the large loss due to the changing composition of the metal in the ladle.

Converter Steel Castings.

Prof. Bradley Stoughton read a paper on "The Annealing and Manufacture of Converter Steel Castings". He pointed out the advantages and disadvantages and purposes of annealing and stated that the microscope and pyrometer are useful in annealing work, the former giving the nature of the results achieved and the latter telling the proper temperature. Slow cooling produces thick crystals of ferrite and cementite and to avoid this the steel should be cooled rapidly through its critical range of temperature by an air blast. The author recommended the use of Seger cones for determining the temperatures attained in various parts of the annealing furnace. An ordinary horseshoe magnet is a valuable adjunct in annealing steel castings because, with 0.50 per cent carbon or less, castings lose the power of attracting

a magnet when they reach a temperature of 1,550 degrees Fahr.

In converter practice silicon in steel causes waste in three ways: It increases the slag produced, which increases the amount of metal lost in the slag; it increases the length of the blow, particularly during the interval before the appearance of the carbon flame; and finally all the silicon introduced with the pig iron is burned and this represents a loss of weight. Converters should be worked rapidly at the rate of at least three blows per hour and not less than 12 blows in 3¾ hours. A converter foundry is almost foredoomed to failure if it attempts to compete in the open market with the open-hearth process in castings averaging over 100 pounds each. The converter cannot hope to make large castings at as low a price as the open-hearth furnace, but it can make small castings at a cheaper price and can get better prices on account of greater freedom from blow-holes and better appearance and detail.

A paper on "Titanium in Steel Castings", published in THE IRON TRADE REVIEW, May 25, was read by Charles V. Slocum. It discussed the effect of the introduction of titanium into cast steel.

Electric Induction Furnace.

C. H. Von Baur read a paper on "The Practicability of the Induction Furnace for Making Steel Castings". This paper was accompanied by numerous lantern slides and described in detail the induction type of electric furnace, which has been used in Europe for ten years. When charged with cold metal, this furnace produces castings at a cost of $21.75 per ton, with electricity at 0.6c per kilowatt hour. When hot metal is charged, the steel at the spout is produced in a five-ton furnace for $19 per ton. Mr. Von Bauer discussed in detail the characteristics, chemical composition and physical properties of electric steel compared with converter or open-hearth steel.

Dr. P. Heroult presented a brief paper on "Heroult Electric Furnaces for Steel Castings" which, in abstract, is as follows:

The main feature of what is called strong iron is the low content of sulphur. The removal of sulphur is one of the easiest and most effective operations that can be performed in the electric furnace. It consists simply in pouring into the furnace a charge of molten pig iron, if possible, direct from the blast furnace, if not, from a cupola or other melting apparatus, then heating the metal under a basic slag, which does not have to be scraped or removed except when it is teemed into a ladle with the metal ready for pouring. The contents in carbon, silicon, manganese and phosphorus are not affected by this operation unless this be desired. Bessemer iron can be changed into strong iron, charcoal iron, car wheel iron, or so-called cold-blast charcoal iron, for a cost of about $1 per ton.

It seems probable, that on account of the high grade of material so cheaply produced, most of the iron castings of the future will be made of this improved quality. This new improved product will help to give new life to the iron foundry trade, and will enable it to compete with the steel casting industry.

The session Wednesday concluded with a scholarly paper on "The Microscopic Structure of Iron and Steel", by Prof. Wm. Campbell. This paper gave laboratory directions for the microscopic study of iron and steel and was accompanied by numerous lantern slides, showing the structure of steel rails, bars and gray iron and steel castings.

Thursday Morning Session.

A paper presented by G. L. Norris described the advantages of vanadium alloys in steel castings, particularly in parts subject to severe wear. Mr. Norris stated that vanadium rolling mill pinions have worn two-and-a-half times as long as ordinary carbon steel pinions.

"Foundry Construction", by Geo. K. Hooper, will be published in full in an early issue of THE IRON TRADE REVIEW. This paper was read by title.

Brent Wiley, in a paper on "Electric Motor Drive for Foundries", discussed the advantages of this system over other methods of transmitting and distributing power. The average plant load is one-third the total capacity of the motors installed, considering only the hoist motors on cranes. About 35 kilowatt hours per ton of steel castings and 45 per ton of iron castings is the amount of electrical power required in an average, well-equipped plant. The paper also took up points regarding the load factor, generator equipment and the relative merits of alternating and direct current distribution.

Rotary Cupola Blowers.

R. H. Rice described, and illustrated with lantern slides, a new type of centrifugal air compressor, suitable for use as a cupola blower. This type of machine delivers an extremely steady flow of air. It is said to have a high efficiency, extending over a long period of time and to require a minimum of power.

A paper on "The Application of Lifting Magnets for Foundry Work", which was read by H. F. Stratton, was published in THE IRON TRADE REVIEW, May 25.

"Patternmaking and Patternmaking Equipment" was the subject of a voluminous and comprehensive paper presented by W. S. Giele, of which the following is a summary:

The patternmaking for various classes of castings was discussed at length and included patterns for boiler and furnace castings, stove plate, automobile parts, parts for textile and paper mill machinery, machine tool castings, cylinders, flywheels, chain sprockets, cast iron pipe, valves, pipe fittings, cast iron sanitary ware, open feed water heaters, steam and oil separators, cast iron car wheels, etc. Interesting data were also presented on the methods of mounting patterns for molding machines. It was pointed out that the use of the vibrator to assist in drawing the pattern is quite general, as it does not appreciably enlarge the mold, but merely overcomes the friction of the pattern against the sand and while the pattern without any draft can be drawn perfectly, care should be taken that there is no back draft. Pattern shop equipment was also discussed and numerous labor-saving devices were described. In conclusion it was pointed out that in the pattern shop the capable patternmaker can work much faster with his head than with his hands and his skill and manual dexterity is applied to the best advantage when devoted to the intelligent handling of mechanical equipment especially adapted to patternmaking.

Fuel Oil Air Furnaces.

"The Equipment of Air Furnaces Using Oil as Fuel" was the subject of a paper presented by N. W. Best. He describes a fuel oil burner adapted for application to air furnaces melting malleable iron and predicted that oil will be extensively used in malleable shops on account of the great economies effected as compared with coal. This paper will be published in an early issue of THE IRON TRADE REVIEW.

The following committees were appointed by President Joseph T. Speer: Nominating committee—W. H. McFadden, L. L. Anthes, A. T. Waterfall, E. H. Mumford and A. E. Howell; auditing committee—Wm. Yeagle and W. H. Bole.

Final Session.

An exhaustive paper on "Gas Cavities, Shot and Chilled Iron in Iron Castings", by Thos. D. West, opened the concluding session Friday morning. This paper will be published in full in an early issue of THE IRON TRADE REVIEW. It deals with the causes and remedies of defects in castings due to gas formations, chilled iron embedded in the metal and the occurrence of shot. The paper is the result of a large amount of research and investigation. Shot in castings may be caused by the coke, by the compressive action of the molten metal, by splashing iron falling from the ladle against flat surfaces or produced by careless pouring and also by improper and unskillful molding. Machine-molded castings on account of the greater uniformity of conditions un-

der which they are produced are less liable to defects of this character.

"Titanium in Malleable" was the subject of a paper by C. H. Gale. A series of experiments were made to determine the effect of the addition of titanium alloys to malleable castings when added to the metal in the ladle and also when mixed with the bath in the open-hearth. Test bars with no titanium showed a white fracture, 47,000 pounds tensile strength, 1,180 pounds transverse strength and 6 per cent elongation; bars containing 0.125 per cent titanium added to the ladle had a mottled fracture, 44,000 pounds tensile strength and 1,300 pounds transverse strength, and bars containing 0.25 per cent, added to the ladle, showed a gray fracture, 43,000 pounds tensile strength and 1,900 pounds transverse strength. The tests of bars containing titanium which had been added to the bath, gave better results. The experiments indicate that titanium makes the metal more ductile. Mr. Alexander, in discussing the paper, gave detailed results of some tests conducted under his supervision and concluded that an addition of between 4 and 6 per cent titanium to malleable iron would be of benefit, particularly when pouring large castings.

The remaining papers, "Phosphorus", by H. E. Field; "The Foundry Foremen's Educational Movement", by D. E. Wilson, and "The Pattern Shop Apprentice", by Jabez Nall, were read by title.

Election of Officers.

Major Joseph T. Speer was unanimously re-elected president of the American Foundrymen's Association for the ensuing year. This is a splendid tribute to Major Speer's efficient and capable services, since it is contrary to the custom of the association to re-elect the retiring president. As in previous years, Dr. Richard Moldenke was re-elected secretary and treasurer. The following district vice presidents were elected: First district—F. B. Farnsworth, New Haven, Conn.; second district—W. D. Miles, Buffalo, N. Y.; third district—Walter Wood, Philadelphia; fourth district—A. E. Howell, Nashville; fifth district—R. A. Bull, Granite City, Ill.; sixth district—T. W. Sheriffs, Milwaukee; seventh district—D. R. Lombard, Augusta, Ga.; eighth district—S. B. Chadsey, Toronto.

Buffalo in 1912.

Buffalo was chosen as the place for holding the 1912 convention. Votes of thanks were extended to Dr. Richard Moldenke for extraordinary services, to the committee on papers and to the plant visitation committee. A motion was passed to appoint a committee to suggest a uniform report form for chemical analyses. A brief address by J. S. Seaman, expressing the association's appreciation of Major Speer's administration, concluded the meeting.

Entertainment Features.

Wednesday afternoon, the ladies at the convention were given an automobile ride, covering the principal points of interest in Pittsburg. Dinner was served at the Country Club. Wednesday evening, the Associated Foundry Foremen were entertained at a dinner at the Fort Pitt hotel by the Pittsburg Foundry Foremen's Association. Thursday afternoon was devoted to an excursion by special train to the plants of the Westinghouse Air Brake Co., the Mesta Machine Co. and the Homestead Steel Works. In the evening, the Foundry & Machine Exhibition Co. entertained the members of all the associations and their guests with an elaborate vaudeville program in the music hall of the Western Pennsylvania Exposition Society. Friday afternoon, the members of the various associations and their guests attended the ball game between the Pittsburg and Cincinnati teams, and in the evening a subscription dinner was served at the Fort Pitt hotel.

Brass Founders.

At a joint session of the various organizations, held Tuesday morning, the address of President N. K. B. Patch, of the American Brass Founders' Association, was read in his absence by L. W. Olson. He directed attention to the progress made by the Association during the year and predicted a bright future for the organization. Secretary W. M. Corse announced that the membership has increased 5½ per cent during the last 12 months. At the meeting, held Tuesday afternoon, J. R. Huber read a paper, entitled "The Analysis of Manganese Bronze", and the discussion that followed developed the fact that the physical properties of this alloy cannot be judged by its chemical contents, owing to variations in the methods of manufacture. The use of chilled test bars was recommended.

"The Corrosion of Brass Foundry Products" was the title of a paper, by Wm. Vaughan, which was illustrated by diagrams, showing the effects of sodium sulphate, sodium nitrate and common salt on bronze composition and aluminum bronze. The results of these tests showed that pure copper is the most susceptible and an alloy of copper, 7 per cent; zinc, 29 per cent, and tin, 1 per cent, is the least susceptible to the corrosive influences of sulphite liquors. The discussion further developed the fact that the corrosion of condenser tubes is due to electrolysis, the rate of flow and the temperature of the water and the kind and amount of sediment it contains.

The discussion of a paper on "The Efficiencies of Furnaces" developed the fact that the fuel consumption for melting brass with anthracite coal averages from 2½ to 3 pounds for 100 pounds of metal, coke about 45 pounds per 100 pounds of metal, and oil, from 3 to 3¾ gallons per 100 pounds of metal.

H. W. Gillett presented a paper, entitled "The Pyrometer and the Aluminum Foundry", which was devoted largely to a description and the methods of using thermo-electric pyrometers.

Bronze Melting Temperatures.

An interesting paper on "Bronze Melting and Pouring Temperatures", by C. P. Karr, is given, in abstract, as follows:

C. P. Karr reported the results of tests made in the foundry of the Nathan Mfg. Co., New York City, to ascertain bronze melting and pouring temperatures. For taking these temperatures a Fery radiation pyrometer was used and as the melting temperatures could not be taken in the foundry satisfactorily, these determinations were made in the laboratories of this concern. Yellow brass was used in the laboratory test, which was made from commercial sheet brass clippings and was found to contain about 68.8 per cent of copper, 0.19 per cent of lead and the balance zinc, with a trace of iron. For this composition the pyrometer indicated a melting point of 1,640 degrees Fahr., but on account of the heavy oxidation of the surface it is believed that this reading may be somewhat too low, particularly as the melting point of brass containing 70 per cent of copper and 30 per cent of zinc has been fixed at 1,742 degrees Fahr. Comparative tests were made to ascertain the difference between the drop in temperature of metal melted in a coal-fired pit furnace and metal melted in a coke-fired tilting furnace. As the composition of the metals compared differed from one another, the average copper constituent had to be about the same and this condition was fulfilled. There were three heats in the coke-fired furnaces with six readings at the foundry floor with an average of 1,832 degrees Fahr., and 32 readings at the pouring bench with an average of 1,780 degrees Fahr., or an average drop of 52 degrees. There were six heats of the metal in the coal-fired furnaces with 15 readings at the furnace floor, with an average of 1,981 degrees Fahr., and 51 readings at the pouring bench with an average of 1,838 degrees Fahr., or an average drop of 143 degrees Fahr. No definite data, however, was obtained from these tests and Mr. Karr concluded that the pyrometer in the brass foundry is only a precautionary means to an end, but not a cure-all. If at the time the observations are undertaken to establish the correct pouring temperature, the pyrometer readings are concurrently taken both as a check and as a record, and the trial is continued consecutively for at least one week to obtain simultaneous readings and con-

cordant results; then the standard pouring temperature may be arrived at and the real value of the pyrometer will be recognized by readings concurrent with the standard thus obtained.

Brass Foundry Economies.

"Non-Ferrous Foundry Economies and Refinements" was the subject of a paper presented by E. A. Barnes, which is given briefly herewith:

The buildings for brass foundries should be fireproof and while many designs lend themselves to non-ferrous metal foundry practice, the saw-tooth having its advocate where land is cheap, or the gallery or many-storied building where land is at a premium, my preference is for the gallery construction. The heating of a foundry is of prime importance and I prefer direct radiation derived either from coils of iron pipe built along the wall under the windows or sectional, cast iron radiation similarly placed. Ventilation is another important feature and in saw-tooth and gallery construction buildings the lantern in the roof should be arranged with swinging windows, the natural tendency of the heated gases being to rise and pass out of these openings. This action can be augmented by the use of fans. We have found that the best form of pattern storage racks can be constructed by the use of heavy wire netting mounted on light angle supports. These racks are fireproof and the sand that sticks to the patterns, eventually falls off and sifts through the meshes in the wire. A burglar and fireproof vault, centrally located, should be provided for metal storage. The sand bin should be so arranged that the sand can be unloaded directly from freight cars or wagons into the bins by means of chutes. The crucibles in our plant are stored in a brick vault, which is heated by the waste furnace gases.

Sanitary Arrangements.

The foundry should be equipped with suitable toilet rooms and in our shop we have individual, hygenic wash bowls allotted to each employe, provided with hot and cold water. Each man is also assigned a metallic locker. Shower baths, needle baths, and dressing rooms have also been provided. Suitable meters should be installed in connection with each melting unit so that the exact amount of fuel needed for the melting of the metal can be readily ascertained. In connection with our air compressors, we have arranged special automobile radiator cooling devices, through which the jacket water is circulated when the air compressors are operated. When the air compressors are idle, the water ceases to circulate. In our foundry the brass from the punch press department and the borings and turnings from the machine shop are melted with the gates, sprues and new metal. Much of this material, however, is of a mixed nature and is melted in a special scrap furnace and run into ingots. These ingots are analyzed by the chemist and are further alloyed with pure copper and other new metals in varying proportion and first class metal for all general purposes is thus produced. Aluminum is melted in a tilting furnace arranged with an iron kettle and the loss is only 2½ per cent. We confine our alloys and mixtures to a small number and at present we have no more than 15 to contend with.

The closing session of the Brass Founders' meeting was held Friday morning. "The Determination of Nickel in Alloy" was read by title. A paper on "The Effect of Repeated Melting on Manganese Bronze", by Jesse L. Jones, described experiments made in remelting manganese bronze to determine the average percentage of loss in crucible and open-flame furnaces, which was ascertained to be about 4 per cent.

Election of Officers.

Officers for the ensuing year were elected as follows:

President, L. W. Olson, Ohio Brass Co., Mansfield, O.

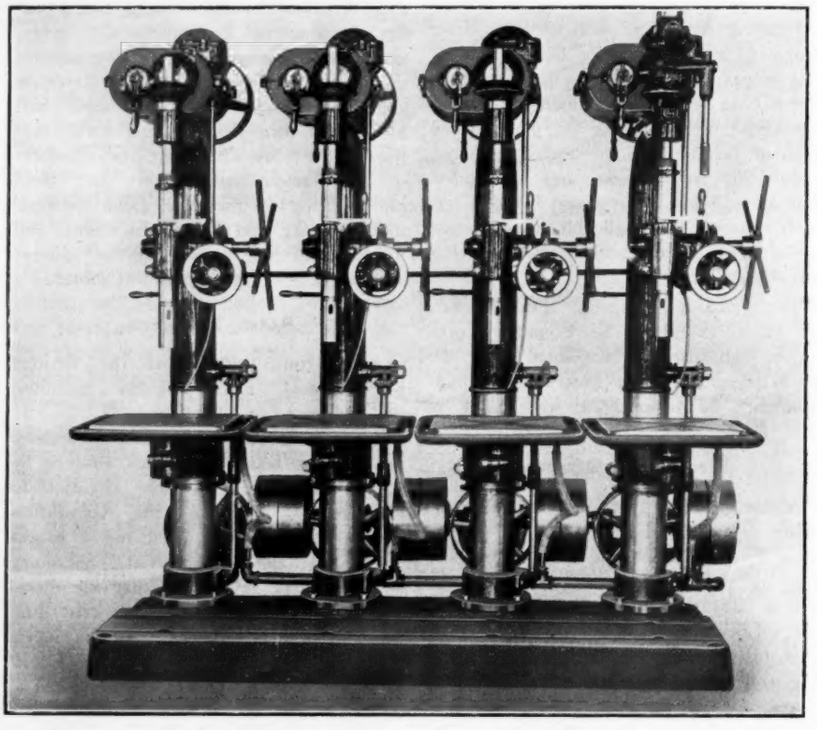
Secretary and treasurer, W. M. Corse, Lumen Bearing Co., Buffalo.

Vice presidents: F. W. Thompson, Monel Metal Co., Orford, N. J.; R. T. Roberts, National Brass & Copper Tube Co., Hastings, N. Y.; P. F. Augenbraun, Yale & Towne Mfg. Co., Stamford, Conn.; G. H. Clamer, Ajax Metal Co., Philadelphia.; S. Mueller, Mueller Mfg. Co., Decatur, Ill.; R. C. Faunt, Faunt Bros., Chicago; H. W. Gillett, Aluminum Castings Co., Detroit; J. Cessna Sharp, J. C. Sharp Brass Works, Chattanooga, Tenn.; N. K. B. Patch, Lumen Bearing Co., Toronto; Richard R. Mitchell, The Robert Mitchell Co., Ltd., Montreal.

At the annual meeting of the Associated Foundry Foremen, Robert B. Thompson, of the Buffalo Pitts Co., was re-elected president, Hugh McPhee was re-elected secretary, and W. H. Woods, president of the Pittsburg Foundry Foremen's Association was elected first vice president.

Four-Spindle Drilling Machine

The accompanying illustration shows a new four-spindle, high-speed drilling machine, recently placed on the market by the Sibley Machine Tool Co., South Bend, Ind. In designing this drill, the manufacturers have endeavored to place on the machine all those features which add to its convenience and effectiveness without making it too complicated. The individual tables are square instead of circular and, therefore, may be placed close together so they can be used as one table for the whole machine, or any one of them may be raised or lowered to accommodate different size jigs. Each spindle is independent of the others in operation and has its separate, quarter-turn, countershaft instead of a single pulley drive for all four spindles, with connection through friction clutches for each drill. This type of drive has been selected because it delivers the full amount of power to each drill and tends to eliminate all



A Four-Spindle, High-Speed Drilling Machine

troubles incident to the use of friction clutches.

A geared pump, driven from one of the countershafts, supplies oil from a large tank to all four spindles. The oil is returned to this tank through drains from each table.

The operator can take care of all four spindles without being obliged to go around back of the machine or even to the side for any speed changes or adjustments. The machine can be started and stopped, speeds and feeds changed and spindle returned from directly in front. The gear case is located on the top of the column. The usual geared tapping attachment is fitted to the fourth spindle.

Electrically-Driven, Jar-Ramming Molding Machine

An electrically driven, jar-ramming molding machine, equipped with a stripping plate, built by Henry E. Pridmore, Chicago, is shown in the accompanying illustrations. The plain jar-ramming machine is not equipped with the stripping plate equipment and is adapted for the same class of work as other molding machines of the jar-ramming type. The machine exhibited at the foundrymen's convention at Pittsburg was of the plain type, equipped with a table, 30 x 36 inches. The power is transmitted from the motor shaft to an enclosed worm and worm gear connected to a shaft to which a cam is attached which operates a bell crank lever having a leverage of two to one. The cam contacts with a roller on one end of the bell crank. The table, which is well-ribbed to uniformly distribute the blow, drops on a wood fiber ring on the base or anvil of the machine. Only a 2½-horsepower motor is required to operate this machine, which has a capacity for ramming molds weighing two tons and strikes 175 blows per minute. The drop of the table is ¾ inch. On the plain jar-ramming machine, exhibited at Pittsburg, a half mold for a gas engine casting, molded in a 21 x 44-inch flask, 8 inches deep, was rammed with 42 blows in less than one-half minute. The motor is entirely enclosed and can be located at any convenient point near the machine. The current consumption is exceedingly low and the power cost is consequently very small. The machine is operated by a friction clutch with lever attachment.

The electrically operated machine, shown in Fig. 1, is equipped with a stripping plate and represents a further development of this type of machine. The patterns mounted on the pattern plate consist of six wagon skeins molded in one flask. The stripping plate is not attached to the table, but rests on the four lifting posts, by means of four pins on the stripping plate which pass through openings in the jarring table and rest in recesses in the tops of the four posts. In Fig. 2 the four posts are shown raised, thereby lifting the stripping plate. The posts are raised and lowered in supports attached to the base of the machine. The posts are lifted simultaneously by two bars, on either side of the machine, actuated by a crank movement, which contact with rollers on pins attached to the bottoms of the lifting posts. While the stripping operation, on the machine shown, is actuated by a hand wheel, it is the intention to drive the stripping plate mechanism by power transmitted from the same motor that operates the molding machine.

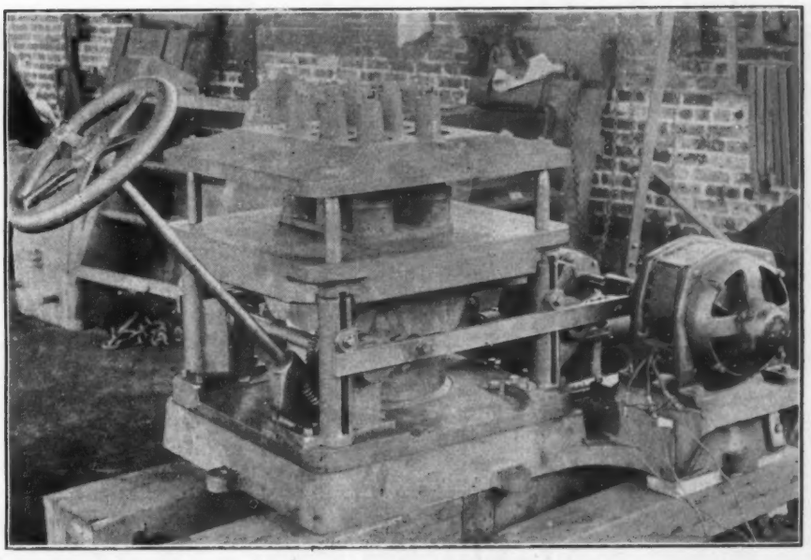


FIG. 2—ELECTRICALLY-OPERATED, JAR-RAMMING MACHINE, WITH STRIPPING PLATE RAISED

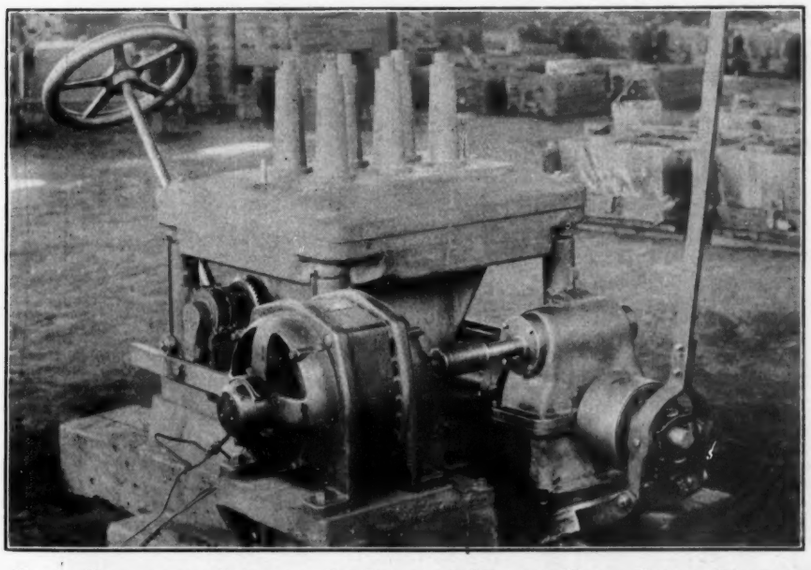
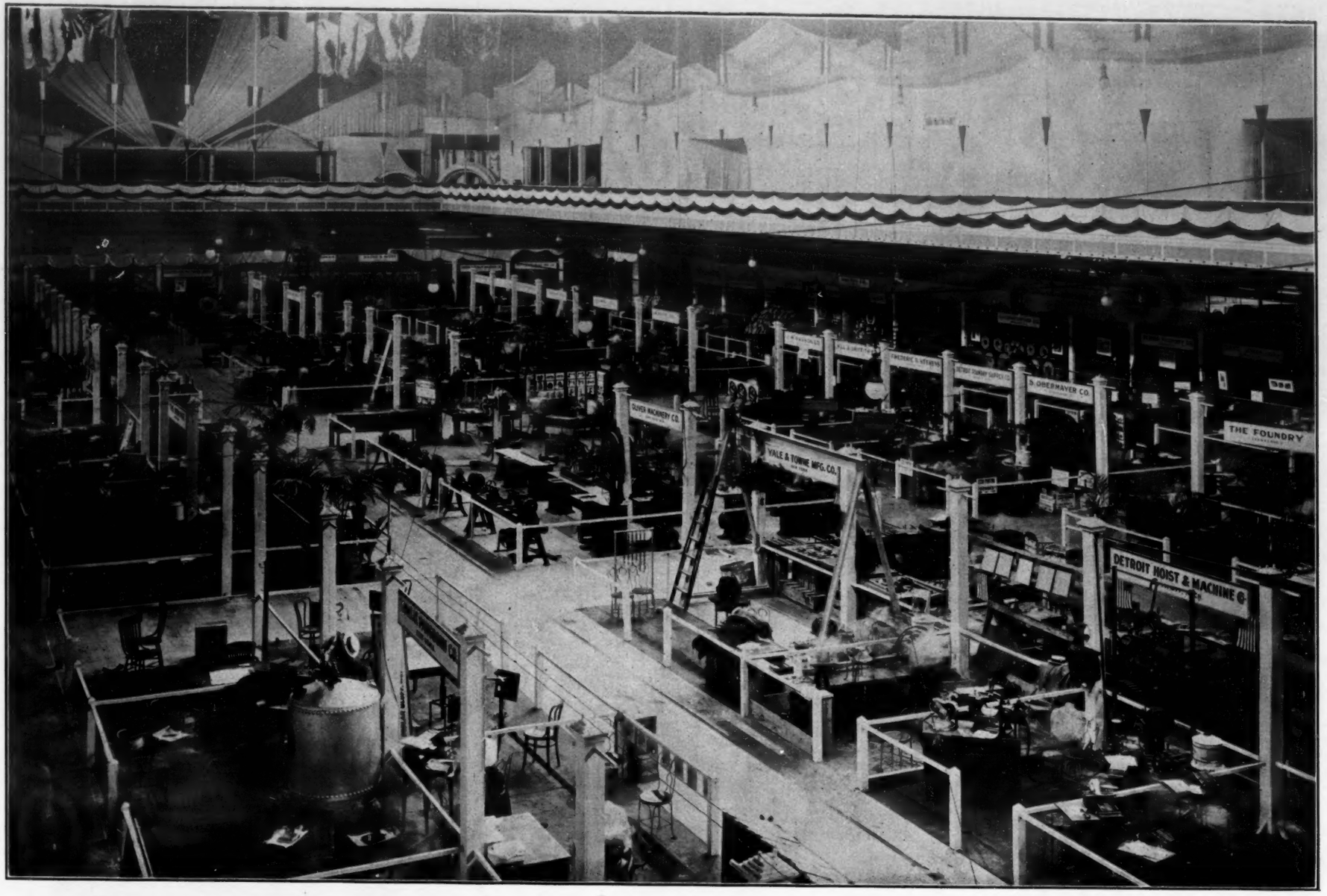


FIG. 1—ELECTRICALLY-OPERATED, JAR-RAMMING, STRIPPING PLATE MOLDING MACHINE

The Mining & Coking Equipment Co., with main offices in Pittsburg, Pa., has been incorporated under the laws of Pennsylvania. The company, beside manufacturing and selling the Beutlich coke oven door and other equipment, will design special equipment for the mining and coking industry. The officers are: President, A. F. Ehrenhaft; secretary and treasurer, Richard F. Beutlich.

The Ideal Concrete Machinery Co., South Bend, Ind., has filed notice of increase of capital stock by $200,000 preferred and $300,000 common stock.



A View in the Main Building, Showing a Part of the Exhibition of Foundry Equipment and Machine Tools, Held at Pittsburg, May 23 to June 1.

Foundry Equipment and Machine Tool Exhibition

Wonderful Display of Labor-Saving Tools and Appliances for the Foundry and Machine Shop — List of Exhibitors

Concurrent with the convention of the various foundrymen's organizations held in Pittsburg during the week of May 22, was conducted the exhibition of foundry and machine shop equipment, under the auspices of the Foundry and Machine Exhibition Co. Both in number of exhibits and in extent of space occupied, the show surpassed all previous efforts, and this feature, started in Cleveland only five years ago as an adjunct of the foundrymen's meetings, promises to develop into a great, annual industrial exhibition of not only equipment and supplies for the casting plants, but also of machine tools and every metal manufacturing appliance.

When the doors of the two large buildings of the Western Pennsylvania Exhibition Society were opened on Tuesday evening, May 23, practically every space was occupied, and there was an overflow of exhibits in the court between the two buildings. The number of manufacturers represented totalled 116 and approximately 35,000 square feet of exhibit space was occupied. Both buildings were magnificently decorated and the uniformity of the railings and signs produced a pleasing and harmonious effect.

Molding Machines.

Practically all of the operating exhibits were located in Mechanical Hall, which was practically converted into a machine shop and foundry, equipped with the latest labor-saving appliances. The still exhibits were grouped in the main building, and here also were displayed many tools adapted for foundry and machine shop use. Both in number and variety, molding machines were in the majority, and the number of new types shown reflected the tremendous advancement in molding machine practice in the last 12 months. Much interest was manifested in the large jar-ramming machines displayed, which are now built in sizes of sufficient capacity to ram molds weighing 50,000 pounds. The application of the jar-ramming principle to core machines has also been given a tremendous impetus in the past year, and irregular cores, regardless of size, are now rammed in this way. One manufacturer has departed from the use of compressed air for the operation of jar-ramming machines, and displayed an electrically-operated tool that attracted considerable attention. Machines were shown that embodied every conceivable combination of molding operations, and from this vast array of labor-saving tools, it is doubtful if one cannot be selected that is adapted for machine-molding the most irregular and intricate patterns.

Permament Mold Foundry.

The development of the jar-ramming molding machine, particularly the large units, has generated a demand for equipment for handling sand and drawing the patterns, and numerous appliances were shown that practically complete the sequence of mechanical operation in the production of large molds. The manufacturers of lifting magnets, alive to the economies that can be effected by the use of this device in foundries, made extensive displays of their equipment, while every type of foundry crane was also shown. For melting ferrous and non-ferrous metals, furnaces of all types were exhibited and the application of the useful oil burner for lighting cupolas, skin-drying molds, etc., was demonstrated.

The permament mold foundry in which the Custer process of producing castings in cast iron molds was demonstrated, was the center of attraction throughout the week. A separate building at the side of Mechanical Hall was equipped for this purpose. The iron was melted in a 42-inch cupola furnished by the Whiting Foundry Equipment Co., Harvey, Ill., while the blast was supplied by a centrifugal air compressor installed by the General Electric Co. The permanent mold equipment, furnished by the Custer Sandless Casting Co., Philadelphia, included a 6,000-pound mold for casting a 100-pound mine car wheel; 500-pound mold for 5-pound plow points; 1,800-pound mold for casting two 7½-pound bevel gears; 1,400-pound sash weight mold, and two molds for casting soil pipe fittings. Edgar Allen Custer, inventer of this permanent mold process, who was in charge of the demonstration, announced that a cast iron mold is now being perfected for casting standard cast iron car wheels, weighing from 650 to 750 pounds.

Throughout the foundrymen's convention the attendance was large and the mechanical engineers, whose spring meeting opened in Pittsburg on Tuesday, May 30, manifested a great interest in the show and crowded the exhibition buildings throughout Tuesday and Wednesday. The machine tool display was larger than at any previous show, and one exhibitor disposed of a large boring mill and numerous other small tools. Machine tool manufacturers are displaying a greater interest in these shows and a movement has already been started which will result in their joining with the builders of foundry equipment in the exhibit to be held next year.

Practically every exhibitor reported a satisfactory volume of business, and many of the tools and appliances shown were sold on the floor, while one manufacturer succeeded in disposing of his entire exhibit to one purchaser.

List of Exhibitors.

ADAMS CO., Dubuque, Ia.—Molding machines, squeezers, snap flasks, pneumatic rappers, sprue cutters, grinding stands, milling machines, automatic gear-hobbing machines; represented by C. E. Reich, W. J. Spensley, John Nicol, Ignatius Schweitering, John Berringer, Anton Haas, L. E. Marceau and Glenn Muffly.

ALBANY SAND AND SUPPLY CO., Albany.—Samples of selected grades of sand for brass, aluminum and stove plate castings; represented by L. Murray, Chas. H. Bird and Arthur T. Palmer.

AMERICAN VANADIUM CO., Pittsburg.—Vanadium cast steel and cast iron specimens; represented by J. J. Flannery, Geo. L. Norris, C. L. Hastings and W. J. Bird.

ARCADE MFG. CO., Freeport, Ill.—Norcross jarring machines, modern molding machines, squeezers, rotary sand sifter, matchplate hinge, and the modern automatic molding machine with sand elevator and dropper; represented by E. H. Morgan, Chas. Morgan, L. L. Munn, F. N. Perkins, R. M. Burton, W. C. Norcross, Henry Tscherning, G. D. Wolfley, Aug. Christen, John Ludolph, Joe Stevens and H. Damman.

ATLAS CAR & MFG. CO., Cleveland.—Storage battery locomotive, new type sand blast car, portable track and side dump sand car; represented by R. S. Richards.

BAIRD & WEST, Detroit.—Solvay foundry coke; represented by E. Stoughton and C. W. Baird. Joint exhibit with Pickands, Brown & Co.

JONATHAN BARTLEY CRUCIBLE CO., Trenton, N. J.—Crucibles, retorts, stoppers and a variety of graphite specialties; repre-

A View of the Operating Exhibits in Mechanical Hall

sented by Samuel H. Dougherty, Lee T. Ward, Herbert D. Cole and Lewis L. Lawton.

BERKSHIRE MFG. CO., Cleveland.—Hand-squeezing and pattern-drawing molding machines, plain squeezers and automatic molding machines. Also a full line of snap flasks, iron flasks, etc.; represented by R. H. York, J. N. Battenfeld and C. F. Battenfeld.

CHARLES H. BESLY & CO., Chicago.—Patternmakers' disc grinder for wood and direct-connected, motor-driven grinder for metal, pressed steel ring wheel chucks, geared level-feed tables, rotary fixture, temper taps, oil, spiral circles, cement and glue; represented by Charles A. Knill, Wm. H. Allen, Edward P. Welles and John Miller, Jr.

S. BIRKENSTEIN & SONS, Chicago.—Brass founders' alloys; represented by E. E. Berliner, H. Birkenstein, J. B. Nieman and Lee Kahn.

GEORGE F. BLAKE MFG. CO., East Cambridge, Mass., Clayton Air Compressor Works and Deane Steam Pump Co.—Two sizes core wiring straightening machines, dustproof, enclosed frame, splash lubricated air compressors, pneumatic sand riddles; represented by Frederick H. Thatcher, A. F. Murray, Frank Goodman, W. B. Stamford and R. L. Radcliffe.

BLYSTONE MFG. CO., Cambridge Springs, Pa.—Ore sand mixers; represented by P. L. Blystone, J. F. Mather, J. A. Bolard and W. E. Wright.

BROWN SPECIALTY MACHINERY CO., Chicago.—Hammer core machines; represented by Elmer A. Rich Jr., and John Laycock.

A. BUCH'S SONS CO., Elizabethtown, Pa.—Combination jar and squeeze molding machines, aluminum snap flasks, steel flask bars, pattern cement, bottom boards, cast iron castings, cast iron flasks for the gravity molding machine with bottom boards and bars and special pouring ladle with bail; represented by R. S. Buch and George E. Bates.

BUCKEYE PRODUCTS CO., Cincinnati.—Parting compounds, binders, blackings, brass fluxes and core compounds; represented by Charles A. Goehringer and Edward Leisl.

BURROUGHS ADDING MACHINE CO., Detoit.—Burroughs adding machines; represented by Ward Gavett and H. F. Happer.

CARBORUNDUM CO., Niagara Falls, N. Y.—Carborundum and aloxite grinding wheels, carborundum fire sand and carborundum rubbing bricks; represented by George R. Rayner, W. W. Sanderson, O. C. Dobson, Anthony Dobson, J. P. McCann, C. D. Sargent and H. A. Eaton.

CHICAGO PNEUMATIC TOOL CO., Chicago.—Compound, belt-driven air compressors, sand rammers, tripod sand sifter, pneumatic geared wire rope hoists, chipping hammers, electric grinder, side spindle electric drill, pneumatic grinder and casting cleaner; represented by H. S. Hunter, F. J. May, D. F. Geissinger, E. N. Zwing and W. C. Walker.

CHISHOLM & MOORE MFG. CO., Cleveland, O.—Chain hoists, trolleys, hand power traveling cranes and malleable castings.

CLEVELAND PNEUMATIC TOOL CO., Cleveland.—Sand rammers, riveting and chipping hammers, air drills, emery grinder and air hose couplings; represented by H. S. Covey, A. Scott and J. T. Graves.

CLEVELAND WIRE SPRING CO., Cleveland.—Steel tote boxes, steel foundry barrels, steel kegs, steel shelving, steel sprue boxes, coil wire springs; represented by J. W. Campbell and C. H. Erickson.

CUTLER-HAMMER MFG. CO., Milwaukee.—Lifting magnet adapted for foundry use; represented by E. E. Brossius and Messrs. Holbrook and Chesebrough.

DALTON ADDING MACHINE CO., Poplar Bluff, Mo.—Adding machines; represented by J. L. Dalton and H. M. Cammack.

DEMING CO., Salem, O.—Hand and power pumps, fire extinguishers and white washing machines; represented by George G. Raddin, W. L. Deming and F. S. Nichols.

DETROIT CORE MACHINE CO., Detroit.—Core machines; represented by A. N. Kelley and G. Herbert Rounsifer.

DETROIT FOUNDRY SUPPLY CO., Detroit.—Represented by M. S. Fox and W. Bruce Howard.

DETROIT HOIST & MACHINE CO., Detroit.—Pneumatic geared hoists, pneumatic motors, pneumatic winches; represented by J. C. Fleming and F. B. Fleming.

DIXON, JOS., CRUCIBLE CO., Jersey City, N. J.—Crucibles for both brass and steel melting, special shapes and formulas for various purposes, phosphorizors, stirrers, skimmers, stoppers, nozzles, sleeves, etc., graphite refractories, foundry facings, motor brushes and granite products; represented by Dudley A. Johnson, F. R. Brandon, John A. Condit and Frank Krug.

DOGGETT, STANLEY, New York.—Foundry specialties, parting compounds, manganese dioxide, soapstone, graphite facing, powdered charcoal, dioxide of manganese flux, ferro-manganese, ferro-silicon, iron and steel cement, soapstone, crayons and pencils; represented by Stanley Doggett.

ELECTRIC CONTROLLER & MFG. CO., Cleveland.—Lifting magnets, controllers and automatic motor starters; represented by J. S. McKee, J. F. Motz, H. W. Eastwood and C. E. Hanna.

ELMIRA FOUNDRY CO., Elmira, N. Y.—Power ramming, roll-over core machines, pasting and venting devices; represented by A. M. Loudor, Thomas Jones and J. D. McCann.

FELT & TARRANT MFG. CO., Chicago.—Comptometer adding and calculating machines; represented by J. C. Nevins, S. C. Brown and W. D. Shimp.

THE FOUNDRY, Cleveland.—Represented by John A. Penton, A. O. Backert, R. E. Densmore, W. A. Tenwinkel, J. C. Eppens, H. Cole Estep and C. Vickers.

H. H. FRANKLIN MFG. CO., Syracuse, N. Y.—Die castings, represented by H. V. Skinner.

GARDNER MACHINE CO., Beloit, Wis.—Patternmakers' disc grinders, single head disc grinders, double head disc grinders, abrasive discs and disc grinders' supplies; represented by F. N. Gardner, F. E. Gardner and L. W. Thompson.

GENERAL ELECTRIC CO., Schenectady, N. Y.—Centrifugal air compressor.

GOLDSCHMIDT THERMIT CO., New York.—Full line of metals produced free from carbon, heating thermit cans, titanium thermit cans, thermit welding process and appliances; represented by Wm. C. Kuntz, E. A. Beck, H. S. Mann and Wm. R. Hulbert.

GRACETON COKE CO., Graceton, Pa.—Foundry coke, represented by C. M. Lingle.

GRAF MOLDING DEVICE CO., Louisville, Ky.—Aluminum roll-up match-plates and hingeless snap flasks; represented by T. H. Graf and A. N. Webb.

HANNA ENGINEERING WORKS, Chicago.—Rathbone multiple molding machine, pneumatic shakers, oscillating riddle, sand blast machines, revolving dumping riddle, mold dryer and Hanna riveter; represented by W. L. Laib, James T. Lee and F. H. Scantlebury.

HARBISON-WALKER REFRACTORIES CO., Pittsburg.—Ordinary shapes and standard cupola blocks in fire brick; represented by Hay Walker, J. J. Brooks Jr., K. Seaver, J. E. Morgan, W. N. McKnight, V. A. Giesey, G. S. Troxell and S. A. Bixler.

HAUCK MFG. CO., New York.—Oil burning appliances, including cupola lighters, ladle heaters, core oven and furnace burners, mold dryers, pre-heating and brazing outfits; represented by A. E. Hauck, A. P. Link, A. H. Stein and H. E. Giersch.

HAWLEY DOWN DRAFT FURNACE CO., Chicago.—Metal melting furnaces; represented by F. O. Bartlett, H. J. Stow, D. J. O'Brien, H. E. Schwartz and C. M. Bleyer.

HERMAN PNEUMATIC MACHINE CO., Zelienople, Pa.—Jar ram stripping plate machine, jarring molding machines with roll-over and pattern-drawing device, jarring molding machine; represented by A. M. Frauenheim, M. L. Heyl, Charles Herman, Alfred Herman, Andrew Rodgers and C. E. Pettee.

HERRUTH CORE OIL CO., Chicago.—Small electric core oven and core oil; represented by George A. Humelbaugh.

HILL & GRIFFITH CO., Cincinnati.—Represented by John Hill, John Glass, William Oberhelman and Harry Taylor.

HUNTER SAW & MACHINE CO., Pittsburg, Pa.—Solid tooth saws, inserted tooth saws and saw sharpening machines; represented by F. A. Hunter, J. A. Carrothers and G. W. Agerter.

IDEAL FURNACE CO., Chester, Pa.—Brass melting furnaces; represented by P. J. Sweeney.

INGERSOLL-RAND CO., New York.—Twelve-inch stroke air compressor, pneumatic chipping, caulking and scaling hammers, pneumatic riveting hammers, sand rammers for bench and floor work, pneumatic motor hoists, pneumatic stationary motors, and pneumatic piston and rotary drills; represented by W. H. Armstrong, W. A. Armstrong, E. P. Mooney, H. E. Metcalf, W. B. Brendlinger, James Moran and J. L. Kelly.

INTERNATIONAL MOLDING MACHINE CO., Chicago.—Light and heavy designs of stripping plate machines, turn-over draw machines, coremaking machines and squeezers; represented by Edward A. Pridmore, W. W. Miller and J. W. Dopp.

INTERSTATE SAND CO., Zanesville, O.—Molding sand for iron and steel molding; represented by L. K. Brown and E. M. Ayers.

THE IRON TRADE REVIEW, Cleveland, O.—Represented by John A. Penton, A. O. Backert, R. E. Densmore, H. Cole Estep, W. A. Tenwinkel, E. W. Word, H. A. Andresen and L. P. Sutter.

JAMES JILES CO., Pittsburg.—Molding loam and core sand, common loam for open-hearth furnaces, etc.; represented by John W. Jiles and C. L. Kelly.

JONES & LAUGHLIN STEEL CO., Pittsburg.—Steel products.

KEYSTONE COAL AND COKE CO., Pittsburg.—Coal and coke; represented by E. M. Gross, W. F. Elwood and A. F. Syroth.

KILLING'S, E., MOLDING MACHINE WORKS, Davenport, Ia.—Stripping plate machine, roll-over machine, multiple cylinder, jarring machine, jarring rock-over machine, two sizes of automatic squeezers; represented by E. Killing, A. W. Fox, C. P. Aabye and George Heck.

LAWLOR IMPROVED JARRING MOLDING MACHINE CO., Pittsburg.—Lawlor improved Jarring molding machines; represented by Ralph W. Hills, Robert Sweeney and J. J. Lawlor.

DAVID LUPTON'S SONS CO., Philadelphia.—Steel sash for side walls. Pond continuous sash for monitor and saw-tooth roofs, rolled steel skylight anl photographs and drawings of designs for foundry and forge shops; represented by Clarke P. Pond and W. C. Scott.

J. S. McCORMICK CO., Pittsburg.—One 5-ton and one 10-ton continuous sand screen and mixing machine, general foundry supplies and facings; represented by J. S. McCormick, T. E. Malone, S. R. Costley and R. H. Mills.

McCOY & BRANDT, Pittsburg.—Motor starters and controllers manufactured by Allen-Bradley company, Milwaukee; represented by H. E. McCoy.

MIDLAND MACHINE CO., Detroit.—Hand rammed, roll-over molding machines and foot jolt core machines; represented by George L. Grimes.

MONARCH ENGINEERING & MFG. CO., Baltimore.—Furnaces using oil or gas as fuel for melting and heating, core ovens, steel foundry ladle, heating equipment, aluminum furnaces, bolt heating furnaces, blowers, etc.; represented by H. D. Harvey and David R. Steele.

MORNER & SMITH, Dayton, O.—Patterns and aluminum snap flasks; represented by Louis Morner and Charles D. Smith.

MOTCH & MERRYWEATHER MACHINERY CO., Cleveland.—Bullard vertical turret lathe, Gould & Eberhardt shaper, Gould & Eberhardt hobbing machine, Lapointe vertical keyseater, Lapointe broaching machine, Heald twist drill grinder and Ransom motor-driven dry grinder; represented by E. P. Bullard, F. L. Eberhardt, G. E. Merryweather, E. C. Keener, J. P. Ransom and E. C. Batchelar.

MOTT SAND BLAST MFG. CO., Chicago.—Sand blast air compressor and painting apparatus; represented by David Mayer.

MUMFORD MOLDING MACHINE CO., Plainfield, N. J.—Jolt ramming molding machines, high trunnion squeezers, plain squeezers, split pattern machine and pneumatic hand traveling crane; represented by E. H. Mumford, Carl Falk, E. M. Huggins, F. W. Hamel and A. J. Goss.

NATIONAL CORE OIL CO., Buffalo.—Cores and samples of various grades of oil; represented by C. H. Cotton, P. L. Crandall, C. M. Anderson, J. J. McCarty and B. J. Cummins.

NORTHERN ENGINEERING WORKS Detroit.—Electric crane trolley and joint exhibit with Cutler-Hammer Mfg. Co., Milwaukee, Wis.

NORTON CO., Worcester, Mass.—Grinding wheels, alundum and crystolon, abrasive materials, oil stones, crystolon sharpening stones, alundum refractories consisting of small electric furnace parts, cores, tubes, muffles, crucibles, combustion boats, filtering dishes, etc., for laboratory use; represented by George S. Welker and N. C. Hilton.

OBERMAYER, S., CO., Cincinnati.—Foundry supplies; represented by E. D. Frohmann and S. T. Johnston.

OHIO SAND CO., Conneaut, O.—Molding sand; represented by U. E. Kanavel.

OLIVER MACHINERY CO., Grand Rapids, Mich.—Pattern and flask-making machinery, saw benches, band saws, hand joiners, surface planers, wood lathe, speed lathes, patternmakers' bench, universal tool grinders, disc sander, vertical spindle and disc sander, vertical spindle borer and wood trimmers and the Oliver universal wood milling machine; represented by Joseph W. Oliver, George F. Reinhard, A. S. Kurkjian, Walter Mentzer, Arthur Blake and R. A. Smith.

ORENSTEIN-ARTHUR KOPPEL CO., Pittsburg.—Steel dump car, platform car, turntable, portable track, etc.; represented by B. H. Behrens.

OSBORN MFG. CO., Cleveland.—Plain jolt molding machines, core jarring machines, roll-over rock-down molding machines, direct draw roll-over machines, rock-over molding machines, flask stripping machines, stripping plate machines, drop plate squeezing machines and mechanical pattern drawing machines; represented by H. R. Atwater, F. D. Jacobs, E. T. Doddridge, J. H. Galloway and W. J. Halliday.

THOMAS W. PANGBORN CO., New York.—Sand blast machines; represented by J. C. Pangborn and Harry D. Gates.

PAWLING & HARNISCHFEGER CO., Milwaukee.—Single line grab or clam shell bucket in connection with monorail electric hoist, crane controllers, electric hoists and I-beam trolleys; represented by George L. Mead and F. P. Breck.

J. W. PAXSON CO., Philadelphia.—Foundry supplies; represented by Howard M. Bougher, W. Scott Thomas, Howard Evans and Ira V. Kremer.

T. J. PETERSON CO., Chicago.—Core oils and compounds; represented by George A. Burman, J. Purvis, Robert Brandt, George W. Doty and H. S. Peterson.

PICKANDS, BROWN & CO., Chicago.—Display of Solvay coke; represented by B. T. Bacon, E. A. Bateman, G. A. T. Long and J. A. Galligan.

PITTSBURG STEEL FOUNDRY, Pittsburg.—Cast steel open-hearth ladle, cast steel charging box, swinging grinder; represented by E. R. Williams.

PITTSBURG VALVE FOUNDRY & CONSTRUCTION CO., Pittsburg.—Valves, castings, etc.

HENRY E. PRIDMORE, Chicago.—Stripping plate machines, rock-over drop machines, electric motor-driven jarring machines; represented by R. E. Turnbull, D. F. Eagan, A. V. Magnuson and Henry A. Pridmore.

ROBINSON AUTOMATIC MACHINE CO., Detroit.—Automatic machines for all kinds of metal polishing; represented by C. F. Coda.

ROCKWELL FURNACE CO., New York.—Centric pouring crucible furnace; represented by F. S. Garrett, W. S. Quigley, A. W. Moyer and S. L. Barnes.

ROGERS, BROWN & CO., Cincinnati.—Pig iron, coke, ferro-manganese and fluor spar; represented by Thos. A. Wilson, J. Raymond Morehead, Harry S. Philson, Wm. P. Cheney, H. B. B. Yergason and James R. Darragh.

SAND MIXING MACHINE CO., New York.—Auto sand mixer; represented by Wm. A. Heartt, Hutton H. Haley, John Bradley, B. F. Doup and V. E. Minich.

WILLIAM SELLERS & CO., INC., Philadelphia.—Centrifugal sand mixing machine, belt-driven and motor driven, drill grinding machine, motor-driven, universal tool grinding and shaping machine; represented by Edward L. Holljes.

SHEPARD ELECTRIC CRANE AND HOIST CO., Montour Falls, N. Y.—Trolley for three-motor electric traveling crane with cage, including the controllers, cage-controlled electric traveling hoist and back-geared electric motor; represented by Wm. C. Briggs, Henry M. Hallett, G. H. Wood, Chas. W. Ingalls, Norman P. Farrar and Wm. A. Battey.

W. W. SLY MFG. CO., Cleveland.—Miniature display of cleaning mills, cinder mill and dust arrester and sand blast equipment and machines; represented by H. J. Norris, G. J. Fanner and H. R. Morse.

SMITH, J. D., FOUNDRY SUPPLY CO., Cleveland, O.—Foundry supplies; represented by J. S. and Pierce Smith.

STANDARD LINSEED CO., Cleveland.—Samples of core oils; represented by N. Weisenberg, A. C. Bernsteen and H. G. Tremmel.

STANDARD SAND & MACHINE CO., Cleveland, O.—Machinery for treating sands for all kinds of foundry practice, including a mixing, rolling, crushing and blending plant, batch mixers, power adjustable screen and pulverizing disintegrating machine; represented by H. E. Boughton, J. A. Boughton, E. J. Smith and Mr. Morgan.

STERLING WHEELBARROW CO., West Allis, Wis.—Rolled steel foundry flasks; represented by I. R. Smith and John L. Kirk.

FREDERIC B. STEVENS, Detroit.—Foundry supplies; represented by Frederic B. Stevens.

SUPERIOR SAND CO., Cleveland.—Molding sands for heavy, medium and light gray iron, malleable, brass and aluminum castings; represented by W. H. Smith and H. C. Koontz.

TABOR MFG. CO., Philadelphia.—Standard power squeezing machines, roll-over machines, shockless jarring machines, combined jarring and roll-over machines, combined jarring and squeezing roll-over machines and Taylor universal tool grinder; represented by John T. Ramsden, S. Newbold, C. W. Coleman, J. H. Coleman and C. H. Ellis.

TATE, JONES & CO., INC., Pittsburg.—Brass crucible furnace, oil pumping, heating and regulating system, oil burners, portable burner for ladle drying and cupola lighting, etc., represented by R. G. Kirkwood, J. M. etc.; represented by R. G. Kirkwood, J. M.

TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y.—Recording pyrometer, radiation pyrometer and other small instruments; represented by Ralph C. Schwanz.

UNITED STATES GRAPHITE CO., Saginaw, Mich.—Represented by H. C. Woodruff, Frank E. Goddard, Roy A. Corrigan and James G. Drought.

WADSWORTH CORE MACHINE &

EQUIPMENT CO., Akron, O.—Wadsworth improved coremaking machines, core ovens, sand mixing and compound mills; represented by George H. Wadsworth.

WESTINGHOUSE ELECTRIC & MFG. CO., Pittsburg.—Motors and controllers for direct and alternating current and variable speed work; represented by B. Wiley, F. H. Herzsch, J. H. Klinck, E. M. Wise, W. B. Wilkinsin and E. B. Townsend.

WHITING FOUNDRY EQUIPMENT CO., Harvey, Ill.—Standard heavy duty exhaust tumbler with steel plate barrel and lever type door fastener, spur geared crane ladle with standard gear cover, worm geared crane ladle, truck for crane ladle and standard turntables; represented by G. R. Brandon, C. A. Hardy, A. H. McDougall, R. H. Bourne, T. S. Hammond, J. Hyslop, R. E. Prussing, N. S. Lawrence, G. E. Jones, W. B. Lewis and W. Mayor.

WHITNEY KEMMERER CO., Pittsburg.—Foundry coke, represented by C. S. Bygate.

G. H. WILLIAMS CO., Hoisting, conveying and excavating machines; represented by E. P. Lord.

J. B. WISE, Watertown, N. Y.—M. R. V. brass melting furnaces of the tilting type with permanent crucible using coke as fuel, represented by R. F. Goyne and R. J. Ryan.

YALE & TOWNE MFG. CO., New York.—Hand and electric hoists with trolley running on I-beam; represented by H. R. Butler, A. W. Patterson Jr., and T. J. White.

New Catalogs

RECORDING VOLTMETERS.—The Bristol Co., Waterbury, Ct., in bulletin No. 131 describes and illustrates recording voltmeters, for direct and alternating current. Both stationary and portable instruments are included.

TACHOMETER.—Preliminary bulletin No 146 A, issued by the Bristol Co., Waterbury, Ct., describes and includes a price list on the long distance recording tachometer manufactured by this concern. This instrument is designed for measuring the number of revolutions of shafting and machinery.

BOLTS.—The Columbus Bolt Works, Columbus, O., has issued a catalog describing its line of bolts, turn buckles, rivets, screws, vehicle parts and other products. The information included is very complete and has been arranged in tables which make the catalog a book of value for ready reference. All price lists included have been revised.

CONCRETE.—"Cement, Sand and Gravel for Concrete" is the title of a booklet issued by the Chicago Portland Cement Co., 50 North La Salle street, Chicago, for distribution among consumers of cement. It is designed to guide the user in his selection of sand and gravel and includes directions on how to wash and screen, as well as judge, sand.

METAL SAWING MACHINES. — An attractive loose leaf catalog has been issued by the Q. M. S. Co., Plainfield, N. J., in which are described the line of metal sawing machines, hand power traveling cranes, jib cranes, I-beam trolleys, pneumatic hoists, power hack saws, car wheel grinding machines, car stops and pneumatic pit jacks manufactured by this concern.

HAMMER DRILLS.—The Ingersoll-Rand Co., 11 Broadway, New York, has issued a pamphlet which describes a heavy type of the valveless, telescope feed hammer drill manufactured by this concern. This tool is intended for stoping, raising and to a limited extent, drifting. The machine described represents an improvement in design over the older types of valveless hammer drills.

RAILWAY MOTORS.—A railway motor, designed to meet the demands of heavy city and suburban service, is described and illustrated in a bulletin issued by the General Electric Co., Schenectady, N. Y. This motor is rated at 50 horsepower and is suitable for either two or four-motor equipments. The bulletin contains dimension diagrams, characteristic curves, a table of speeds and other information.

ROLLS, ROLL LATHES, SHEARS AND INGOT CARS.—In a handsomely illustrated catalog, issued recently, the Youngstown Foundry & Machine Co., Youngstown, O., describes a number of products which it manufactures. This concern is prepared to furnish figures and estimates on all kinds of rolling mill and blast furnace equipment, but makes a specialty of rolls, roll lathes, billet and lever shears, either motor or belt-driven, ingot cars and other machinery.

TOOL STEEL.—The Firth-Sterling Steel Co., McKeesport, Pa., has issued a 64-page booklet which is devoted to its line of high speed steel for lathe, planer and boring tools, milling and gear cutters, threading and chasing dies, wood-working tools, reamers, drills, taps, etc.; high speed steel bits for toolholders, special tool steel for chisels, punches and dies, blacksmith tools, etc., drill rod and alloy steel. The booklet contains a list of prices of the various products as well as extras for various sizes. The booklet is of vest pocket size and contains a number of memoranda pages.

OIL PUMPS.—Square and round types of lubricator oil pumps are illustrated and described in a 16-page catalog, issued by the Richardson-Phoenix Co., Milwaukee. In addition to pointing out the special applications and advantages of the force feed lubricator for cylinder lubrication on main units and auxiliaries, the proposition of adequately lubricating auxiliaries is discussed at some length. Interesting data concerning different types of power plants show that the rubbing surface and also the power consumption of auxiliaries bears a rather high ratio to the total power output of the plant.

VALVES, SLUICE GATES, ETC. — The Chapman Valve Mfg. Co., Indian Orchard, Mass., has issued a handsomely illustrated, cloth bound 174-page catalog and price list, 6 x 9 inches. In it are described the valves, fire hydrants, indicator posts, sluice gates, shear gates, floor stands and other products which this concern manufactures. A revised system of code-words is included and a large number of illustrations showing especially interesting installations of Chapman valves, are reproduced. Particular attention has been devoted to the chapter on sluice gates, under which head all information of value regarding the use of sluice gates has been gathered. The book is intended for use by contractors and engineers as well as by the general trade.

STEAM SHOVELS.—The Thew Automatic Shovel Co., Lorain, O., has recently issued a new catalog describing and illustrating its full circle swing steam shovels. These shovels have now been in use for nearly 15 years. The distinctive feature claimed for the Thew shovel is the application horizontally of the power for the crowding motion, that is, the motion of the dipper forward into the material. These shovels are recommended for use in highway construction, stripping operations, cellar and foundation work, in brick yards, mining operations, quarries and for general excavating and stock-pile handling purposes. These shovels are furnished in a number of standard designs and are provided either with traction wheels or with car wheels fitted to any desirable gage. This concern also furnishes shovels for special purposes.

OIL BREAK SWITCHES.—The General Electric Co., Schenectady, N. Y., has issued two bulletins which describe two forms of oil break switches manufactured by this concern. These differ mainly in size and the construction of their contacts. One is designed for use on circuits of voltages not exceeding 15,000, while the other has a capacity of from 22,000 to 110,000 volts. The switches are top-connected and are, therefore, adapted to overhead station wiring. Particular attention is directed to the absence of cell work and barriers, thereby tending to greatly reduce the cost of installation. The switches have a vertical motion of the contact rods, and a double break for each pole. When the switches are opened, the contact blades move quickly downward, the break taking place in oil. Either hand-operated or solenoid-operated mechanism can be fitted to these switches.

SCREW CUTTING TOOLS AND MACHINERY.—A very neat catalog has been issued by the Wells Bros. Co., Greenfield, Mass. It is of a handy size, 4 x 5½ inches, and contains 256 pages. It describes the various screw cutting tools and machinery manufactured by this concern, including screw plates for bolts and pipe; taps, dies, die holders; bolt, nut and pipe threading machinery; thread micrometers and thread gages, etc.. Owing to the decline in favor of the V-form of thread, Wells Bros. Co. announces that orders for thread cutting tools hereafter will be filled with United States standard threads, V-form threads and Whitworth standard threads to be furnished only when specified in orders. This concern maintains a publicity bureau which is designed to co-operate with dealers, writing advertisements, and helping them in other ways to develop business. The new work, which is profusely illustrated, supersedes previously issued catalogs.

MOTORS FOR ROLLING MILLS.—A 12-page bulletin, issued by the Crocker-Wheeler Co., Ampere, N. J., is devoted to the special line of motors which this concern manufactures for rolling mills and steel works. The shocks and jars which these motors must withstand are so heavy and the overloads are so sudden that ordinary forms of motors are not usually adapted for this work. These motors require heavy mechanical parts and careful electrical design to prevent sparking. The bulletin contains a number of very interesting illustrations, showing motor installations at various plants and steel works throughout the country used for operating roll tables, angle straightening rolls, furnace charging machines, bloom shears, transfer tables, etc. Crane and hoist motors are illustrated and described in another 20-page bulletin, which contains tables of dimensions, details of construction, etc. Bulletin No. 132, superseding bulletin No. 120, is devoted to belt-driven, direct current motors and shows gauze enclosed types, as well as the fully enclosed type with geared countershaft and a vertical motor with a supporting stand. The various applications of these motors in actual use are shown by numerous illustrations.

High Duty Engine Lathe

In Fig. 1 is shown a new type of 30 and 36-inch, medium pattern, high duty engine lathe, built by the American Tool Works Co., Cincinnati. This type of lathe can be equipped with a 12-speed geared head for belt or motor drive, 12-speed, triple-geared head for cone pulley drive and nine-speed, double, back-geared head and eight-speed single, back-geared head for cone pulley drive. The method of motor application is extremely simple, only three gears being used in connecting the armature and the main driving shafts. A constant speed motor, either of the direct or alternating current type, is located on top of the geared head, and is connected to the main driving shaft through spur gearing. Twelve fundamental spindle speeds are obtainable at from 6 to 275 revolutions per minute and the motor is under constant control through the controller hand wheel conveniently located at the right end of the carriage, where a dial indicates how the controller is set. The fundamental speed changes are made through the manipulation of the levers and hand wheel at the front of the headstock. A sensitive friction clutch is provided on the driving gear for starting, stopping or slightly moving the gears in the head to facilitate making speed changes without shock to the parts or interfering with the motor speed. According to the nature of the work, the motor should be from 7½ to 15 horsepower capacity. The quick change gear mechanism provides a practically unlimited range of changes for feeding and screw cutting, 48 changes being shown on the index plate, listing threads from ½ to 28 per inch. The feed box is a complete unit and consists of a gear box on front of the bed with two levers and a steel sliding tumbler, the latter working in conjunction with a cone of eight steel gears.

The tailstock is of the quadruple clamping stud type with back bolts running to the top of the barrel for convenience in clamping, and is further secured against movement by a pawl dropped into a rack cast in the center of the bed. The tailstock barrel is solid, of large diameter and is equipped with an improved form of plug-binder for clamping the spindle. The tailstock is provided with a set-over feature for turning tapers and is of the offset type, which permits the compound rest to be set in a plane parallel to the bed.

The bed is of deep section and is thoroughly braced by cross-box girths at short intervals throughout its entire length. The carriage is very heavy in the bridge and is gibbed its full length on the back and a clamp is provided on each end at the front, the right hand clamp being used for binding to the bed. The lead screw is 2¼ inches in diameter and is chased on thread per inch, permitting the engagement of half nuts at any point without the use of the thread dial, except when fractional threads are desired. The spindle is of high carbon steel and has a hole 2 9-16-inch in diameter its entire length. The standard length of the bed is 10 feet.

In Fig. 2 is shown a lathe equipped with a belt-driven geared headstock which is of the compound, back-geared type and is similar to that used for motor drive. The 12 spindle speeds are obtained at from 6 to 275 revolutions per minute. The maximum gear ratio is 56.6 to 1. Only 14 gears are used to produce the 12 spindle speeds. The driving pulley is of large diameter and affords a large area of belt contact.

A lathe equipped with a triple-geared headstock, which provides 12 spindle speeds, is shown in Fig. 3. The cone pulley has four steps, 5 5-16 inches thick, which are of large diameter. The triple gears are of the slip gear type and are readily engaged by rack and pinion at the front of the head, through the manipulation of the hand wheel, which also

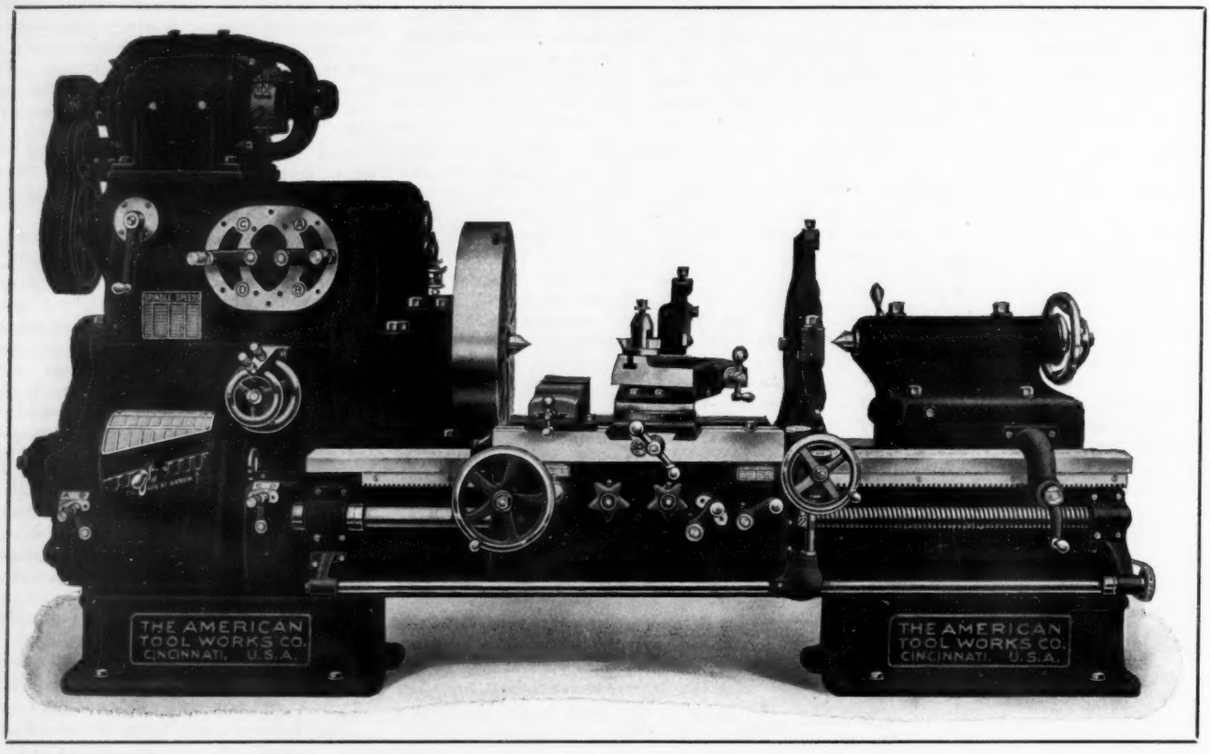


FIG. 1—MOTOR-DRIVEN, MEDIUM PATTERN, HIGH DUTY ENGINE LATHE

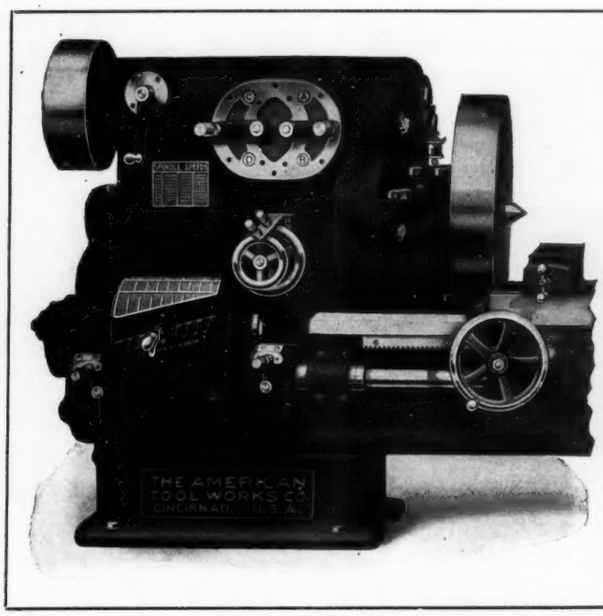


FIG. 2—BELT-DRIVEN HIGH DUTY ENGINE LATHE

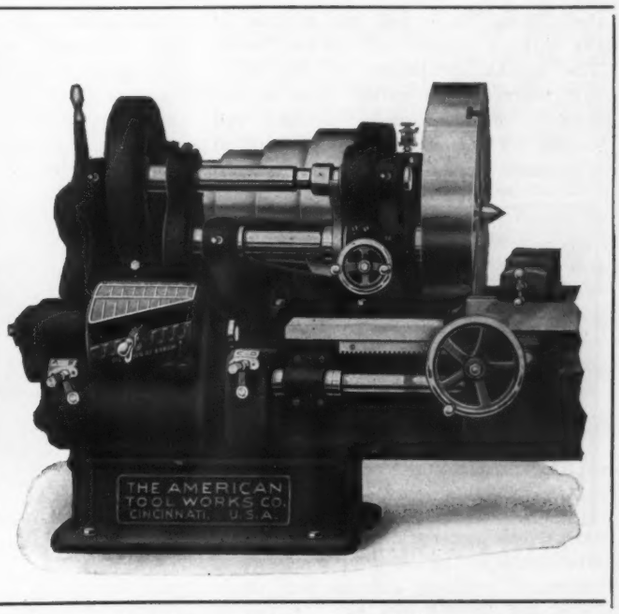


FIG. 3—HIGH DUTY ENGINE LATHE, EQUIPPED WITH A TRIPLE-GEARED HEAD

automatically engages the direct drive to the spindle when the face plate pinion is withdrawn. The internal gear is planed integral with the face plate and the pinion is cut solid with the shaft.

Variable Blow Power Hammer

A variable blow power hammer, built by the Welch Hammer & Machine Co., 1523 Williamson building, Cleveland, is shown in the accompanying illustrations. The distinctive feature of this hammer is the method of transmitting the motion of the eccentric to the helve through the link mechanism by means of which the throw of the helve and the blow can be varied by the operator. A swinging bracket which supports and pivots one end of the link segment, is balanced on bronze bushings, which also form the bearings of the driving shaft. This bracket is connected by two short links to the treadle. A hardened bearing block, accurately fitted to the slot in the link segment, has its end bearings in the U-links, pendant from the beam lever. The short ends of the U-links are connected by straight links to points in the housings directly in line with the pivot point of the link segment at full stroke. In Fig. 1 is shown a hammer direct-connected to a motor with the link segment shifted to position of full stroke. In Fig. 2 the hammer is arranged for belt drive with the link segment on dead center. The free end of the segment is oscillated by an eccentric on the driving shaft, and when on dead center no motion is transmitted to the helve. A slight pressure on the treadle shifts the position of the link with relation to

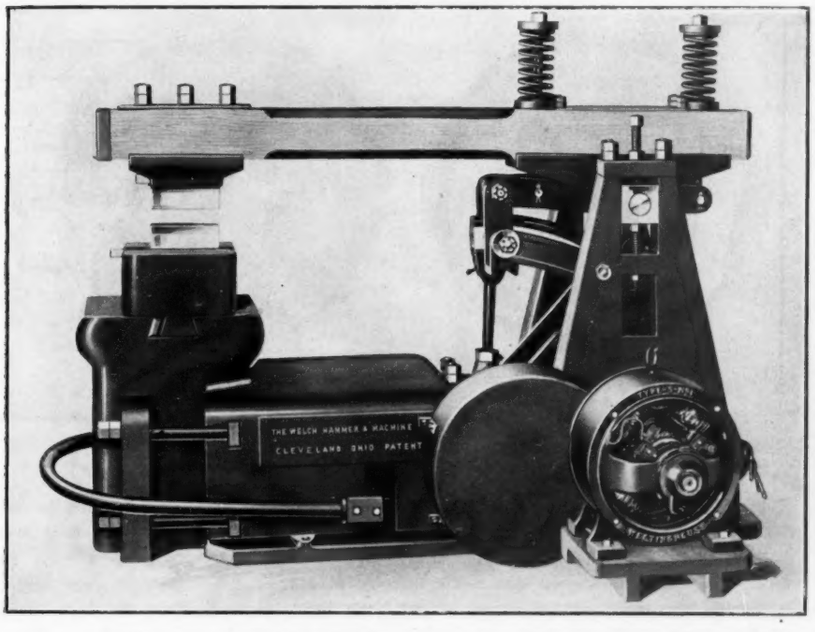


FIG. 1—MOTOR-DRIVEN, VARIABLE BLOW POWER HAMMER

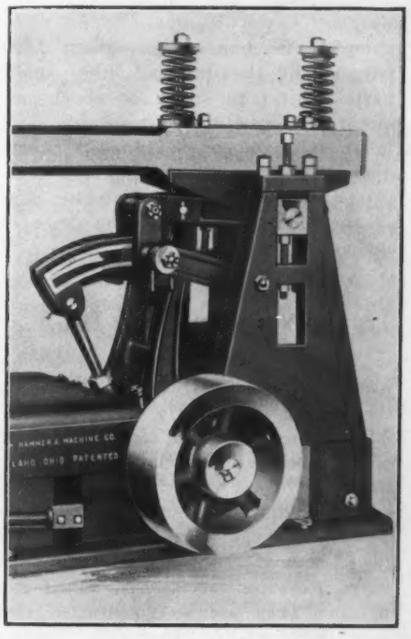


FIG. 2—BELT-DRIVEN HAMMER

the sliding block and the motion of the link is transmitted to the helve. The stroke or throw of the helve can, therefore, be varied from an absolutely dead position to the full stroke. The machine is operated at a constant speed of about 300 revolutions per minute and has the further advantage of striking light finishing blows at high speed.

The flywheel for belt drive and the motor and gearing for motor drive, can be applied to either side of the machine, and the motor drive can be applied to all sizes and styles of these hammers. A balancing mechanism is located between the housings and balances the swinging bracket, thereby removing the weight of the helve from the bracket. The helve is balanced on a pivot shaft and beam lever by coil springs on top of the helve. These springs are adjustable and keep the helve under tension, with the result that the helve vibrates like a spring and strikes an exceedingly sharp blow. The anvil weighs 1,500 pounds and is 25 times the weight of the hammer helve. The complete machine weighs about 5,000 pounds and the link and other small parts subject to strain or shock are either steel castings or forgings. The helve is made of seasoned hickory. The floor area occupied by the belt-driven machine is 40 x 78 inches and of the motor-driven machine, 56 x 78 inches.

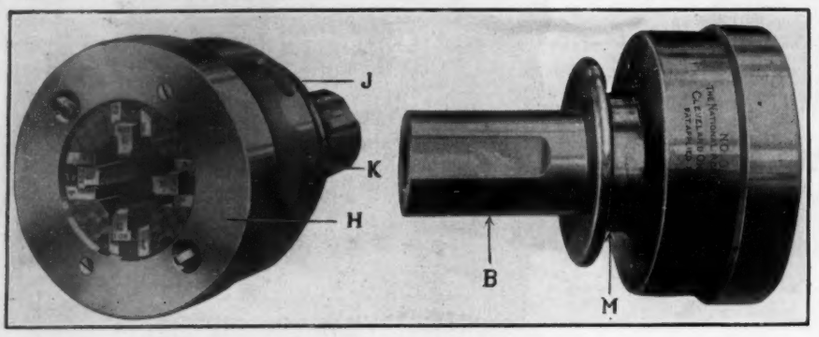


FIG. 1—NEW OPENING DIE MANUFACTURED BY THE NATIONAL ACME MFG. CO.

A New Opening Die

The opening die shown in the accompanying illustrations, manufactured by the National Acme Mfg. Co., Cleveland, is so designed that it can be operated while being revolved, and is built particularly for use on screw machines on which the threading spindle is revolved. The chasers can be removed from the jaws without displacing any of the other parts or necessitating their removal. They are so constructed that they will cut a practically perfect thread without the use of the follow-up cam. A very liberal adjustment for size is provided in the cam arrangement on the chaser blocks. This adjustment is controlled by a very fine pitch screw with micrometer graduations plainly marked. The jaws holding the chasers and the cam surfaces controlling the closing of the die are hardened and ground with a very wide bearing on the cam surface, which holds the jaws firmly in position when the die is closed.

The die consists of a comparatively few number of parts, which are so arranged that the die can be easily taken apart and reassembled, although this seldom becomes necessary, as the cap covering the head prevents chips from entering the working parts and the arrangement of internal parts of the head leaves sufficient space between the operating parts, except the faces of the cams and the surfaces on which they bear, so that grit carried by the oil can work into these spaces and out of the head through openings provided for this purpose in the sides of the head. The die may be cleaned by removing cap, *H*, Fig. 1, from the front face. All parts of the die are made interchangeable to facilitate reassembling or the replacement of worn or broken parts. In Fig. 2, *A* is the body in which the working parts are enclosed; *B* is the head which holds the chaser blocks; *C* is the cam-operating block; *D* is the chaser block with cam for adjusting, milled on the rear end; *E* is the chaser which can only be removed by screw *F*; *G* is one of the screws which holds *B* to *A*, Fig. 2; *H* is the cap which protects the working parts from chips, etc.; *K* is the adjusting screw; *J* the micrometer graduations for adjustment, and *M* is the groove for closing the shoe. The National Acme Mfg. Co. has installed a special department for the manufacture of this die.

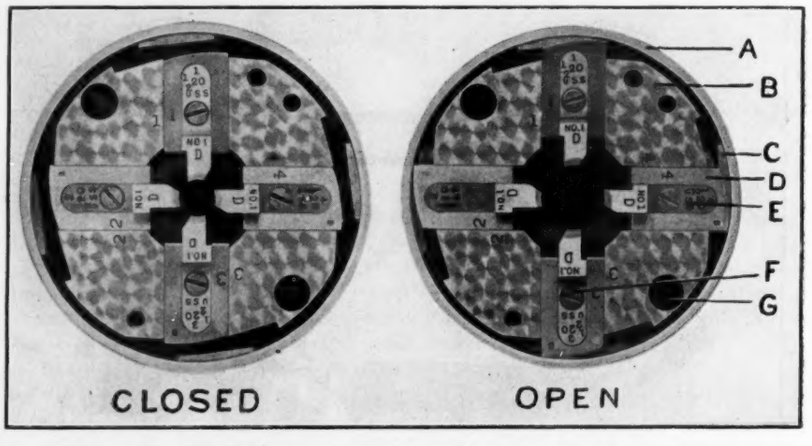


FIG. 2—DIE IN CLOSED AND OPEN POSITIONS

A New Chucking Device for Lathes

In handling a large amount of the work that must be chucked on a lathe, more time is usually consumed in stopping the tool and setting the work, than in performing the tool work necessary on the piece. A chuck for handling rough or partially finished castings, forgings, or pieces cut from a bar, has been perfected by Adolph Muehlmatt, Cincinnati, for use on engine lathes, turret machines and bench lathes. The chuck has been so designed that the work can be placed in the chuck, gripped, machined and removed without stopping the spindle. In addition to the saving of time effected in handling the work without stopping the spindle, the possible inaccuracy in the machined parts, due to some fault in the manipulation of the chuck, is eliminated.

The work is held in iron split chucks, which are actuated by a closing tube inside the spindle, while the tube itself derives its movement from a lever that is placed at the front or rear end of the head, depending on the type of machine to which it is applied. Figs. 1

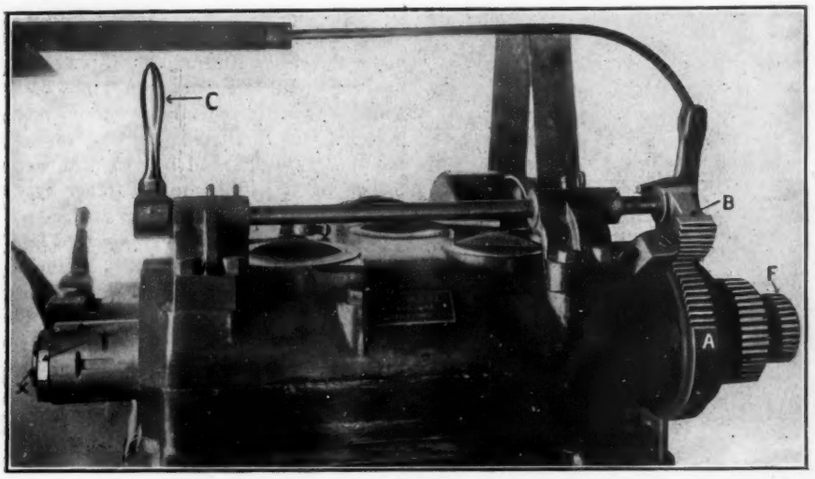


FIG. 1—MECHANICAL SPLIT CHUCK OPERATING DEVICE ATTACHED TO A TURRET LATHE

and 2 show the chucking device attached to a Jones & Lamson turret lathe in the shop of Adolph Muehlmatt and is used for approximately 135 different operations. In Fig. 1 the sliding ring, *A*, is operated by the sector, *B*, which engages the gear teeth on the ring and imparts a rotary motion as the handle, *C*, is moved. Moving this handle toward the operator closes the chuck and pushing it back releases the piece when machined. The sliding ring, *B*, has a helical cam slot that gives it an endwise movement when it is rotated in the outside casting. Three rocker fingers, *D*, Fig 2, with wedgeshape heels contact with an adjustable collar, *E*, at one end of the chucking tube. The chuck-closing fingers are so built that when the chuck is gripped tight on the work, the thrust of the closing tube is straight against the square ends of the fingers and the latter are locked in this position, being relieved of any tendency to open and exert undue friction upon the operating sleeve.

The adjusting nuts, *F*, Figs. 1 and 2, maintain the alignment of the closing tube and provide for adjustment to accommodate the various sizes of work in the chucks. In Fig. 2 are shown an expanding chuck and a contracting, split, cast iron, chuck used with the closing device. Both styles of chucks are built to screw on a common spindle, *H*, which is a part of the spindle that is continuous throughout the closing head of the device. The chucks are of heavy construction.

In the contracting chuck, the closing of the chuck itself is accomplished by the jaws of the circular face plate head at *K*. In the expanding chuck, the beveled center draw bar, *M*, expands the jaws. While considerable pressure is required to close the split jaws, this is not apparent to the operator, as the toggle and cam arrangement turn free on the spindle and with the rotation of the work, practically move into place automatically by centrifugal force, when the machine is in operation.

Fig. 1 shows the chuck used on thin, cast iron discs with the tool drawn up close to the spindle; *T* is the split jaw of the chuck, and *X* is the disc in place. The cost of finishing some pieces, requiring numerous chucking operations, has been reduced 25 to 30 per cent by the use of this chuck and closing device.

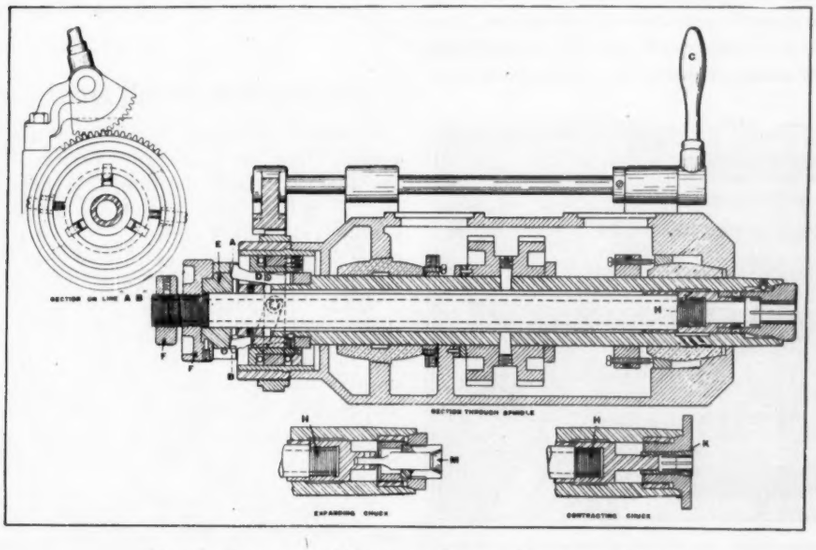
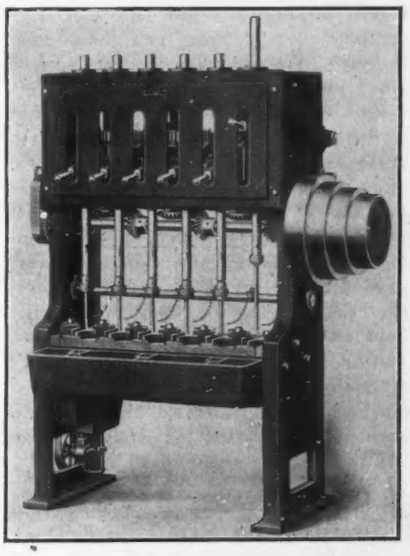


FIG. 2—SECTIONAL VIEWS OF CHUCK-OPERATING DEVICE

Semi-Automatic Nut Tapping Machine

In the accompanying illustration is shown a new design of semi-automatic nut tapping machine, manufac-



SEMI-AUTOMATIC NUT TAPPING MACHINE

tured by the National Machinery Co., Tiffin, O. On this machine rough hot pressed nuts are tapped as readily as cold punched nuts and previous objection to automatic tappers, due to sticking, etc., when small burrs are encountered on rough hot pressed nuts, have been overcome. The tap spindles are raised and lowered automatically. The revolutions of the tap spindles can be varied to correspond to the number of threads on the tap being used. This eliminates non-productive tapping time. The variations in the revolutions of the tap spindles are obtained through a single lever, quick-change speed box on the cam shaft. The raising and lowering of the tap spindles is accomplished by six, three-step cams carried on a horizontal shaft in the rear of the spindle housing. These

cams engage with hardened steel rolls carried in the spindle levers. The cam shaft shifts laterally, so that the various cam faces or steps can be engaged, and in this way the staying or resting time of the tap, when raised, can be altered to suit the period required by the operator for feeding the machine and emptying the taps. An automatic socket is provided, which allows the tap to be removed or inserted while the machine is in operation and ejects the tap automatically when the shank becomes filled with tapped nuts. The life of the tap is also increased over that of a foot lever machine, as the cam movement causes the tap to lower gradually and it does not drop into the hole with the weight of the spindle back of it, causing it to bind and resulting, frequently, in broken taps, stripping of the threads, etc. This machine is built in two sizes of one inch capacity with six spindles and 1½ inches capacity with 10 spindles.

A New Steel Tie

A new type of steel tie, built by the International Steel Tie Co., Hippodrome building, Cleveland, is shown in the accompanying illustration. As illustrated in Fig. 1, the tie consists of two transverse I-beams which are connected at the top by two steel base plates, and by four steel straps at the bottom. These parts are riveted together, thus giving the assembled tie the form of a rectangle, which varies in width from 30 to 36 inches. In building the road, the rails are fastened to the ties by means of malleable gibs which grip the flange and the base plate by means of slots punched in the latter. Each base plate is provided with six slots, three on each side of the rail flange. The slots on one side contain gibs only; those on the other side contain a cotter or wedge which is formed from the metal punched from the slots. These wedges are placed on the outside of one rail and on the inside of the other in order that both rails may have a corresponding motion when the wedges are driven in place.

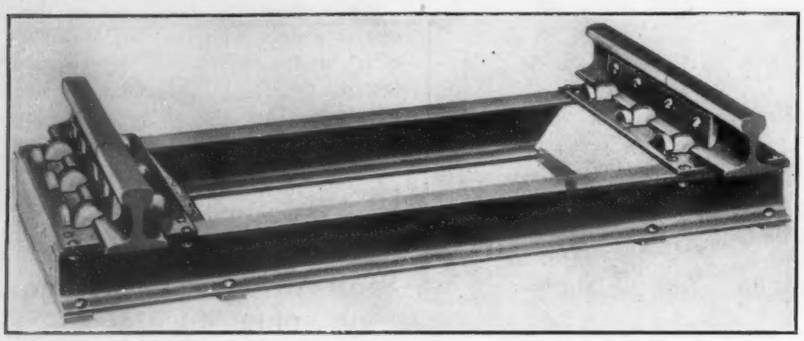


FIG. 1—STEEL RAILWAY TIE WITH CONCRETE BALLAST BLOCKS

The rails are joined at the ends by ordinary fish plates which are connected by six bolts, three through each rail. A tie is placed under each joint, which thus has a continuous bearing, from 30 to 36 inches in length. As a result of this long bearing surface, opposite joints are made practical. It is claimed, that owing to the tight grip of the malleable gibs or fasteners, the rails cannot *creep*, either as a result of expansion through heat, or the vibration due to traffic. In using these ties, two types of road bed are employed. In the open type, both ends of each tie are filled with concrete, before laying. After laying and fastening the rails, the road bed is filled with ballast or is paved. In the other type, the ties and rails are first located, after which solid stringers of concrete are deposited along each rail. Fig. 2 shows a road of the latter type now being constructed at Circleville, O., by the Scioto Valley Traction Co. In this case the rails were first suspended at the desired height by means of wooden beams. After the ties had been placed, the concrete was built up to the lower level of the rails on each side. By this method a particularly accurate alignment and an even road bed were obtained. The cost of construction of this road was $4 per foot.

Standard sections, which are fabricated at Pittsburg by the American Bridge Co., are used in making this tie. It is manufactured in 4, 5, 6, 7 and 8-inch sizes, for light, medium, heavy and extra heavy construction. The 5-inch size, which is used most extensively, contains the following material: 5-inch I-beams, 118 pounds; 5-16 x 12-inch plates, 64 pounds; 3-16 x 1⅜ x 2-inch angles, 21 pounds; ½-inch rivets, three pounds; malleable fasteners, nine pounds. The fish plates and bolts are not included in the tie. No tie rods nor rail braces are necessary in this type of construction.

Among the roads now using this tie are the following: Altoona & Logan Valley Traction Co., Altoona, Pa.; American Railways Co., Philadelphia; Indiana Union Traction Co., Muncie, Ind.; Stark Electric Co., Alliance, O.; Scioto Valley Traction Co., Columbus, O., and Cleveland Railway Co., Cleveland.

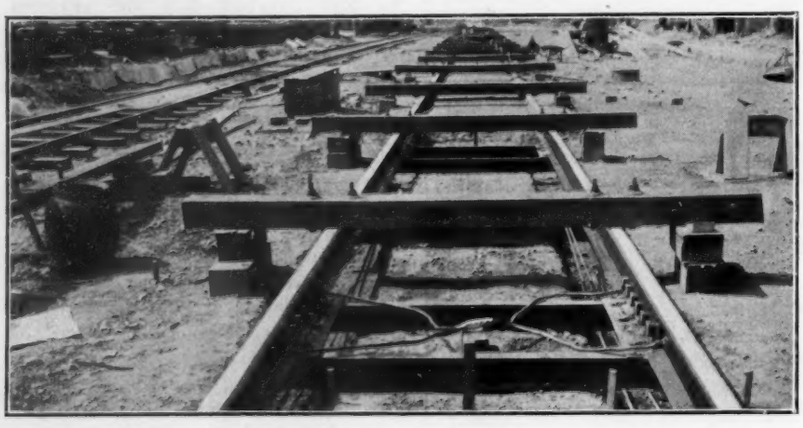


FIG. 2—STEEL TIE AS USED BY SCIOTO VALLEY TRACTION CO., AT CIRCLEVILLE, O.

All-Geared Feed Drill

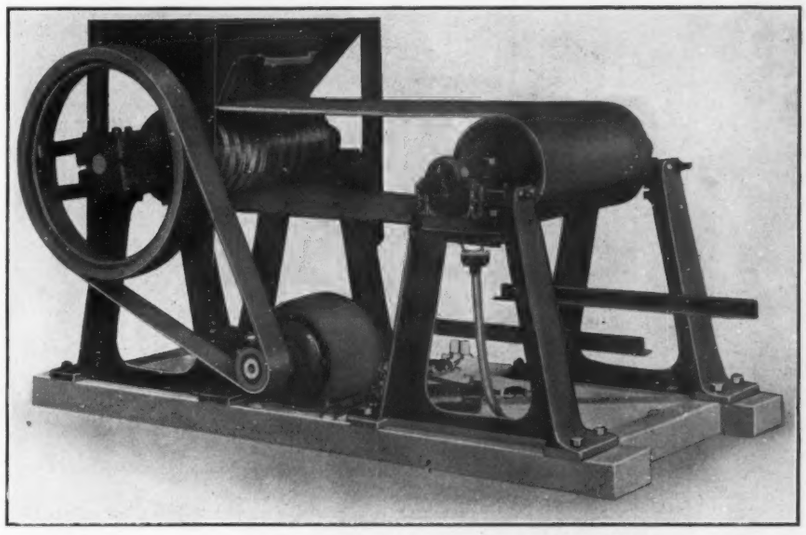
Illustrated herewith is a 20-inch, all-geared, feed drill recently perfected by the Rockford Drilling Machine Co., Rockford, Ill. The feed, which is the principal feature of the machine, consists of a cone of four gears which are keyed to a shaft driving a worm. The worm in turn drives the vertical feed shaft shown at *W* in the illustration. A small gear on the upper shaft meshing with a large driven gear transmits the power to the feed mechanism, the last gear reduction driving an idler which slides on the middle shaft.

This idler can also be dropped into any one of the four feed slots, *S*, which form a part of the gear guard

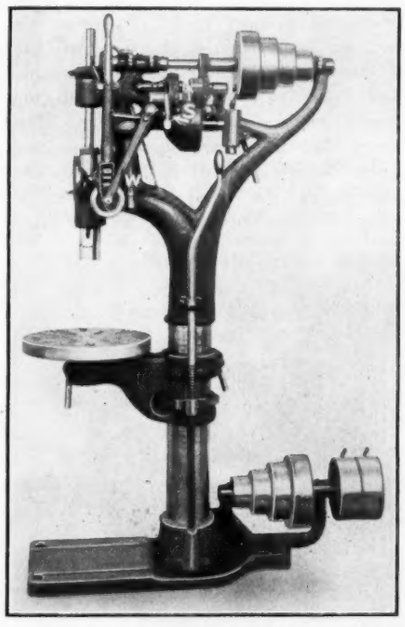
covering the four-step cone of gears. The gears mesh on their periphery and they can be readily engaged or disengaged while the machine is in operation and the feeds can thus be changed at will. Applied to a 20-inch drill press, four feeds are provided, ranging from 0.004 to 0.015 inches.

Magnetic Separator

In the accompanying illustration is shown a magnetic separator, built by the Cutler-Hammer Mfg. Co., Milwaukee, which is designed to remove large pieces of iron or steel from ore, coal or rock that is to be passed through crushers and its application in the foundry is wide, inasmuch as it can be used to advantage for the removal of shot and small particles of iron from molding sand and for the separation of brass chips from machine shop turnings.



A New Magnetic Separator



All-Geared Feed Drill

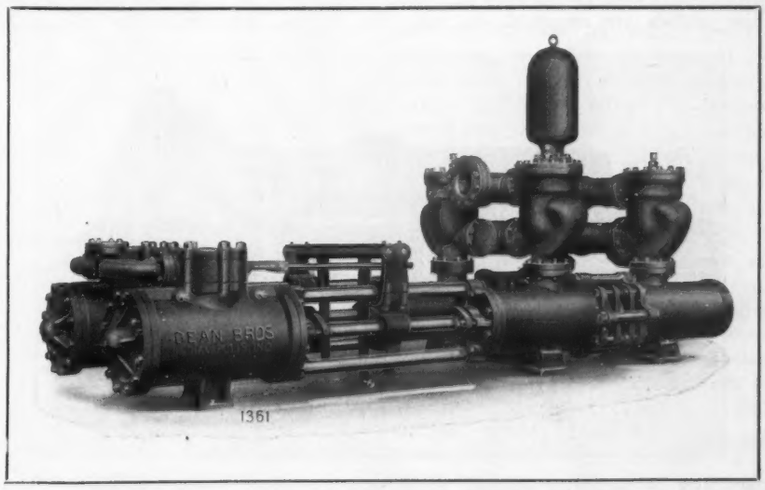
When installed, a chute or other conveyor is placed underneath the magnetic pulley, into which the magnetic material is dropped. The non-magnetic material is projected some distance in front of the pulley, thereby effecting clean separation. The pulley at the head in the accompanying illustration, consists of alternate coils and steel discs concentric with the shaft, the coils being wound on steel spools doweled to the discs, which are in turn keyed to the shaft. Each coil is enclosed and protected by a cylindrical brass coil shield, which is attached to each of the two adjacent poles. Current for the coils is obtained through carbon brushes held on a pair of slip rings by self-adjusting holders.

The material to be separated is fed through a hopper to the conveyor belt, by means of which it is passed over the magnetized pulley; the magnetic matter is drawn toward the face of the pulley, clinging to the belt up to the point at which the belt leaves the pulley at the lower side. At this point it is snapped off into the chute or other conveyor provided. These pulleys are built in lengths from 16 to 36 inches and are 12 inches in diameter. The current consumed varies from 325 to 750 kilowatts and the capacities range from 1,340 to 3,000 cubic feet per hour. The pulleys are designed to operate on any direct-current voltage up to 250.

A High Duty Pump

Modern power house conditions have necessitated new designs in high-pressure plunger pumps. Formerly, power house pumps used saturated steam at comparatively low pressures and pumped against low heads, but modern service requires pumps which will operate with superheated steam against pressures up to and including 250 pounds per square inch. To meet this new demand, pump manufacturers generally have turned their attention to high-duty apparatus. One of the latest pumps of this class has recently been placed on the market by the Dean Bros. Steam Pump Works, Indianapolis.

This pump, which is illustrated herewith, is of the outside, center-packed, pot-valve pattern. It is rather unusual in that it combines the pot valve feature with the outside center-packed plunger. The valves are contained in valve pots, which are easily accessible. The valves, valve seats, guards and springs are of bronze. The valves may be examined by removing a light, hand-hole cover on the valve pots, and after this is done, the discharge seat, with its valves, can be removed bodily and taken to a convenient point for examination and repairs. The suction seat and valves are contained directly underneath the discharge seat and valves, thus making



A High Duty Pump

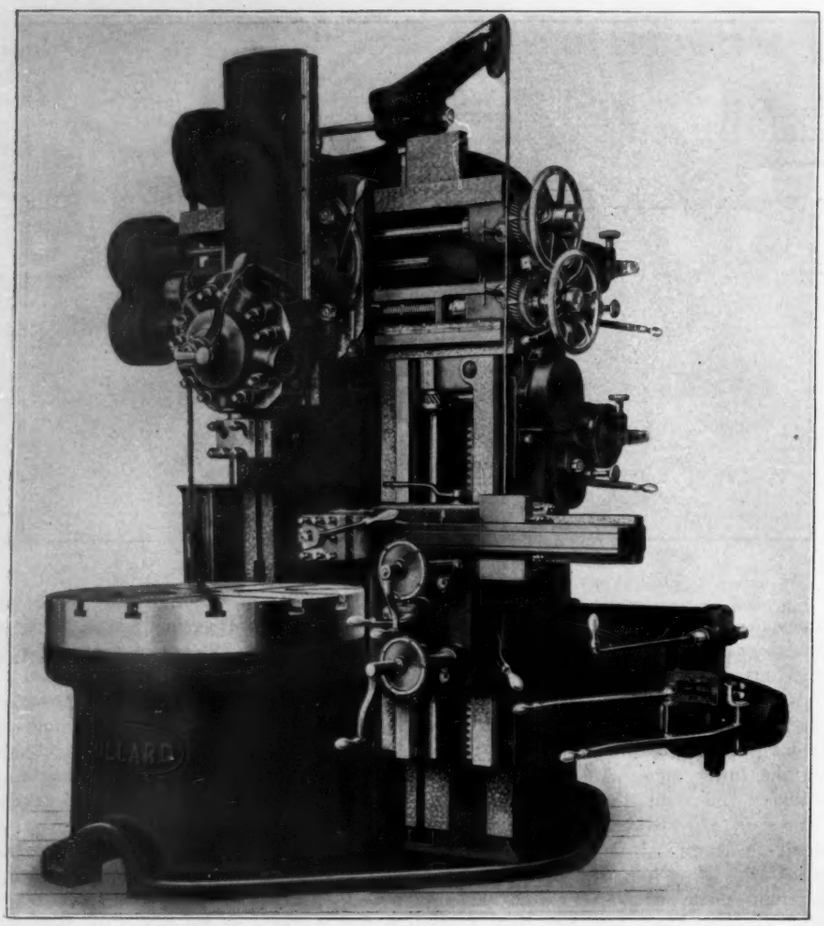


FIG. 1—BULLARD 42-INCH VERTICAL TURRET LATHE

them equally accessible. The pump never needs to be out of commission as an extra set of valves can be kept on hand and inserted in a short time.

The pump has an extra long, 24-inch stroke and is built with plungers, from 6 inches up to 16 inches in diameter. Another unique feature is the frame connecting the steam and water cylinders, which is built up of large steel rods. This gives a light, rigid, open construction. The gland bolts on the plunger glands are removable to facilitate packing. Both the water and steam ends of the pump are tested to a working pressure of 250 pounds and to a static pressure of 500 pounds per square inch.

Vertical Turret Lathe

A 42-inch, vertical turret lathe, built by the Bullard Machine Tool Co., Bridgeport, Conn., is shown in the accompanying illustrations. This machine is provided with one swivel turret head and one non-swiveling, side turret head. The capacity of the lathe is 44 inches in diameter and 32 inches in height under the cross-rail. The maximum distance from the table to the turret face is 43 inches. The table is 40½ inches in diameter and is provided with parallel, T-slots, as well as radial slots. The table is driven through bevel gearing, having a special tooth form which has a rotative effect only. The table spindle, which is of the standard Bullard type, has an angular thrust of large diameter, the side strains being absorbed by vertical cylindrical bearings of ample proportions. The table spindle journals are of cast iron, scraped to create a bearing on the spindle. The entire spindle is immersed in oil.

Twelve speeds, varying from 3.1 to 60 revolutions per minute, are mechanically obtained by means of two systems of selective sliding gears and positive clutches. A multiple disc clutch, readily adjustable, is interposed between the primary speed change device and the main driving shaft, which has a rate of 360 revolutions per minute. The brake parts are integral with the driven member of the disc clutch. The clutch and brake are operated by one lever, the engaging of one automatically disengaging the other. By means of a second lever, any one of four primary speeds may be selectively engaged. Secondary speed changes are obtained in a similar manner. The controlling levers are positively interlocking and the clutch must be released and brake engaged before any speed change can be made. The table speed may be ascertained at any time from a direct reading indicator, which is incorporated in the interlocking device.

The cross-rail is of exceptional width, all of which bears on the face of the column. The side rail has the form

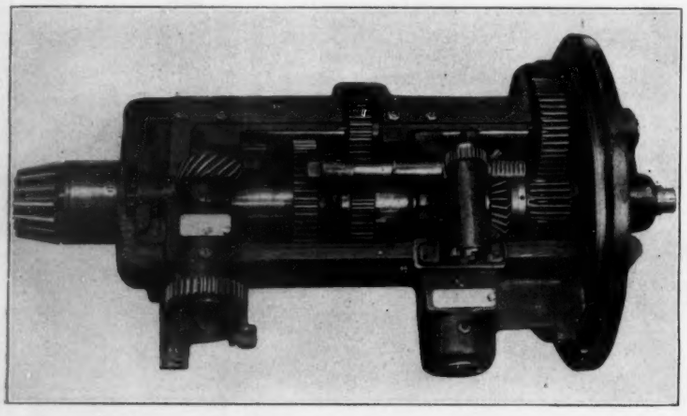


FIG. 2—SELECTIVE SLIDING GEARS FOR EFFECTING SPEED CHANGES

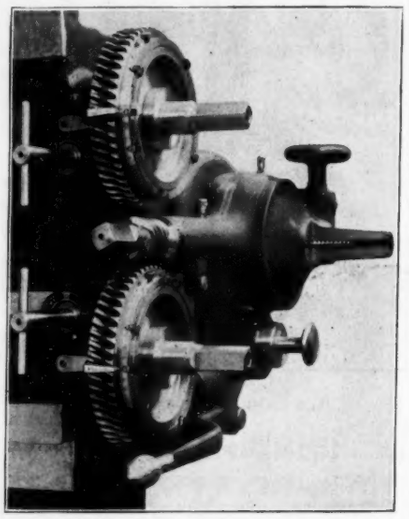


FIG. 3—MICHROMETER DIALS AND OBSERVATION STOPS

of an inverted letter L and is securely fastened to the column and bed. The cross and side rails together form a unit having a vertical power adjustment of 14 inches. The guide bearing for the rails, on the column and bed, is very long in proportion to its width, thus assuring permanency of alignment in the vertical movement of these parts. The same type of guide bearing is employed on the cross-rail and side-rail for the saddles.

There is one vertical and one side head, each independent in its movement, both as to direction and feed. Both heads can be operated jointly without interference on work of small diameter. The vertical head will face 44 inches and has a vertical movement of 27 inches. This head may be rapidly moved in all directions by power, independent of feed works or table drive; vertical and cross motion in either direction may be accomplished either singly or simultaneously. The side head has a vertical movement of 28 inches and a horizontal movement of 21 inches. The maximum distance from the table to the underside of the cross slide is 25 inches.

A center stop is provided for the main head which is designed to permit a movement of 3 inches beyond the center. This stop is claimed to be free from the inherent weakness and consequent inaccuracy of the ordinary center stop. By means of a system of gearing, angular adjustment up to 45 degrees either side of the vertical center is obtained for the main head. The turret slide corresponding to this head has an exceptionally broad bearing on the swivel base and is also provided with the narrow type of guide bearing. The turret is 16 inches in diameter, and, being set at an angle, will swing large tools clear of the slide. It has five faces, each of which contains a hole, 2¾ inches in diameter. The turret holes are steel bushed and are easily replaced in case of wear. Patented half-boxes, secured to the turret by two binder bolts, bear on the split steel bushings in the turret holes, thus securely holding the shanks of tool holders, boring bars, etc. To resist the twisting strain set up by a heavy cut, a pin of large diameter, located at the inner end of the turret holes, enters a slot in the end of the bar or tool holder and acts as a driver.

The side head, which does not swivel, is provided with a four-faced, turret tool holder, which obviates the necessity of constantly changing tools. Feeds for both heads are positive and have eight changes, ranging from 1/96 to ½ inch in all directions. Feed changes are obtained by turning a knurled wheel, and

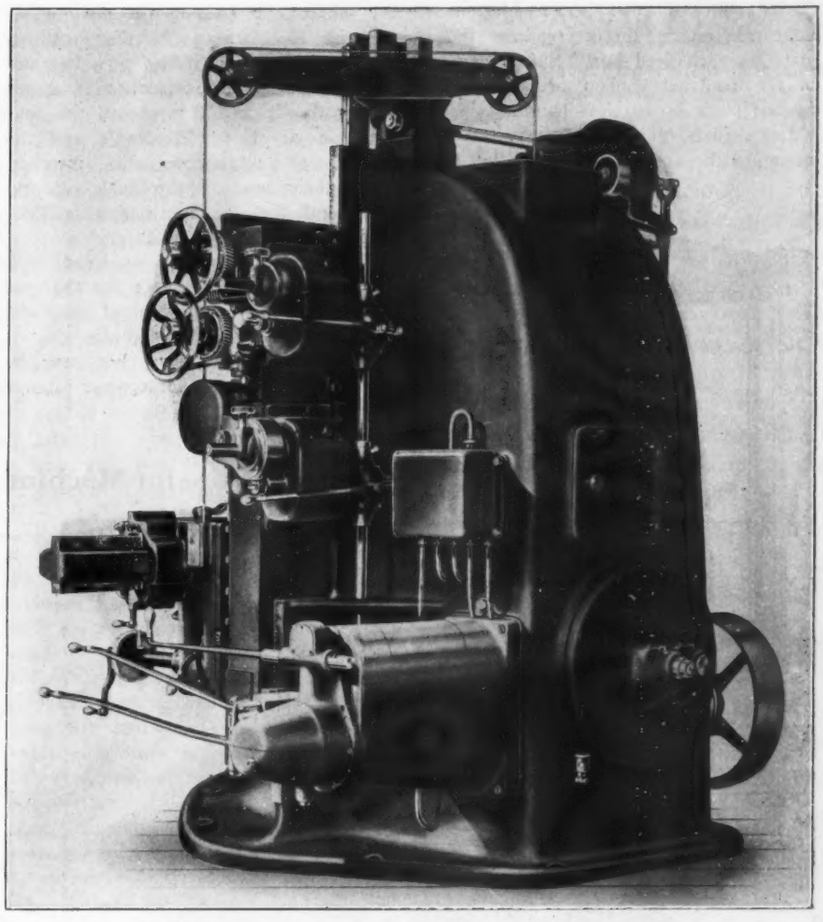


FIG. 5—REAR VIEW OF 42-INCH VERTICAL TURRET LATHE

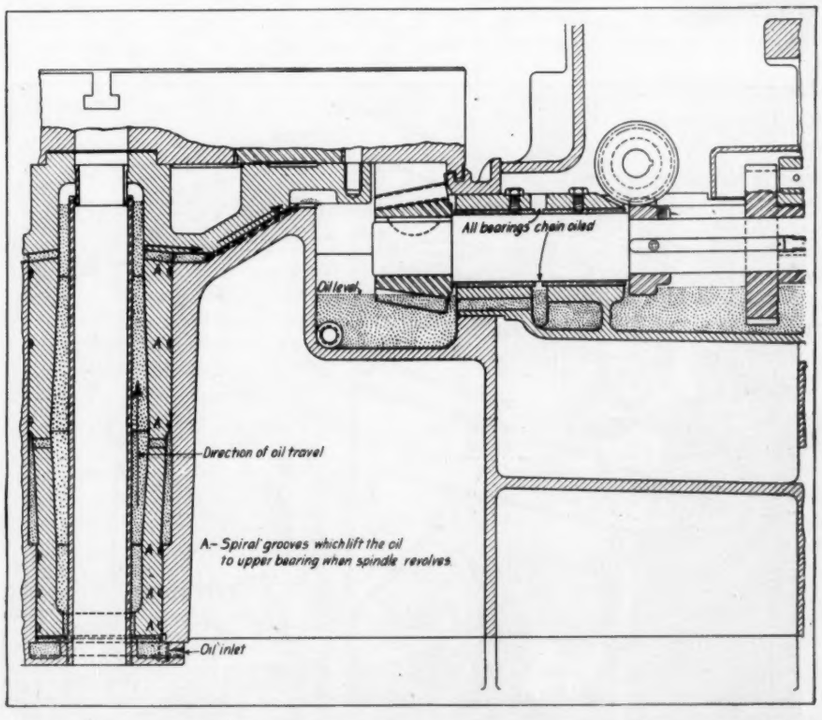
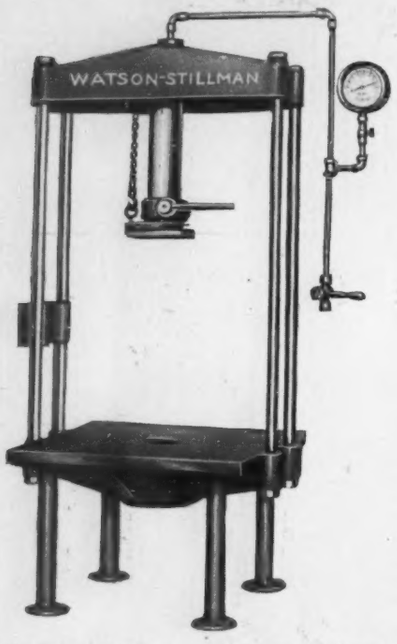

All bearings chain oiled
Oil level
Direction of oil travel
A–Spiral grooves which lift the oil to upper bearing when spindle revolves
Oil inlet

FIG. 4—SECTIONAL VIEW, SHOWING CONSTRUCTION OF TABLE SPINDLE AND THE METHOD OF LUBRICATING THIS MEMBER.

the amount of feed per revolution is indicated on a direct reading index plate on each feed box. Safety devices in the feed mechanism prevent breakage of parts by careless handling.

Index dials, graduated in thousandths of an inch, are mounted on the feed



HYDRAULIC PRESS FOR MACHINE SHOP USE

rods of both vertical and side heads. A graduated scale is attached to the main turret slide, a similar scale being made a part of the cross-rail fence. A scale is also attached to the tool slide of the side head. Observation stops, bearing numbers to correspond with those on the faces of the turrets, are available for the duplication of various sizes.

Alloy steel gears, specially heat-treated, are used throughout the entire driving and feed train of the machine, with the exception of the table gear, whose size does not permit of successful heat treatment. All high-speed journals are bronze-bushed.

The system of lubrication employed in this machine is of the type known as continuous flow. The base of the turret lathe forms a reservoir, which is kept constantly filled with oil. Submerged in the oil, and direct-connected to the main driving shaft, is a gear pump which delivers the oil to a distributing reservoir, located on the outside of the column at a height sufficient to insure free flow through the ducts leading to the bearings and individual reservoirs, in which the gears revolve. The excess oil pumped to the distributor is returned to the sump through an overflow pipe. By means of oil sights in the ducts, the flow of oil can be judged in two ways, by the size of the oil column passing the opening, if the pipe is clear, and by the overflowing at the opening if the pipe becomes stopped up. This construction is shown in Fig. 1. In Fig. 2 is shown the construction of the table spindle and the method of lubricating this member. The lubrication of the table driving gear, and that of the pinion is likewise illustrated in Fig. 2.

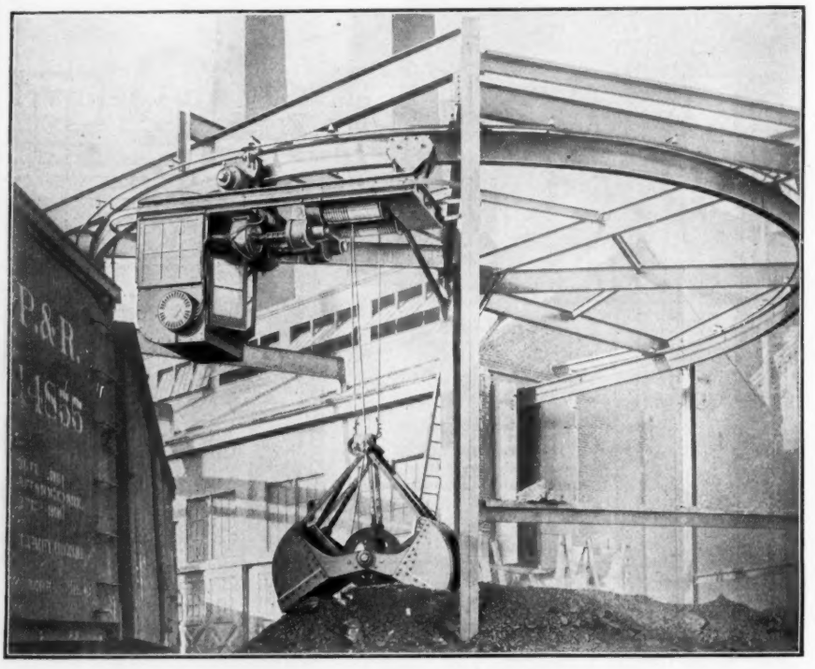
The machine may be provided with a thread-cutting attachment for the vertical head. The net weight of the lathe on the floor is 18,500 pounds. It is furnished for belt drive, but may be motor-driven, a 10-horsepower motor being required.

Hydraulic Press for Machine Shops

In the accompanying illustration is shown a hydraulic press, especially adapted for forcing bearings, bushings and for making similar forced fits. This press was especially designed to meet the requirements of automobile work, and can also be used to advantage in machine shops. The platen for automobile work is seldom more than 3 feet square, but this dimension can be varied if required. A weight counterbalances the ram which can be handled independently of the pump by means of a rack, pinion and lever arrangement. A hole through the platen permits the work to be projected or forced through. The press reaches its maximum capacity of 30 tons under a hydraulic pressure of 6,250 pounds per square inch, which may be produced by using either a hand or belt-driven pump attached to the pipe shown in the illustration. The length of the stroke of the ram is 18 inches and its diameter, 3½ inches. A stroke of 18 inches is usually sufficient for most press fittings. The press is raised to a convenient height from the floor, being mounted on four legs, and is built by the Watson-Stillman Co., New York.

Mono-Rail Grab Bucket Hoist

In the accompanying illustration is shown a mono-rail grab bucket hoist, built by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., and installed in the power plant of the Dill & Collins Co., Philadelphia. This hoist is designed for the rapid and economical handling of coal, crushed rock, sand or any other material which is handled in bulk in the foundry or manufacturing plant. The hoist consists of two independent hoisting units mounted on a structural steel frame connected with a trolley which operates on the lower flange of an I-beam, or mono-rail track composed of T-rails placed on either flange of an I-beam. The hoisting units are enclosed in cast iron cases which likewise form the supports. Planetary gearing is used, which, together with the brakes and all bearing surfaces, is partially submerged in an oil bath. The spur gears used are cut from solid blanks, and the bearings are made of hard bronze and are bored to correct location in



MONO-RAIL GRAB BUCKET HOIST

the hoist frame. Each hoisting unit is equipped with two brakes, mechanical and electric, which operate automatically and will hold the load at any desired point in the line of travel. The trolleys are arranged to swivel and to drive on all four wheels, thus distributing the wear and increasing the tractive power. They are equipped with an electric brake which automatically brings the machine to rest when the power is cut off, and where the service requires, they are equipped with a foot brake with the lever in the operator's cage.

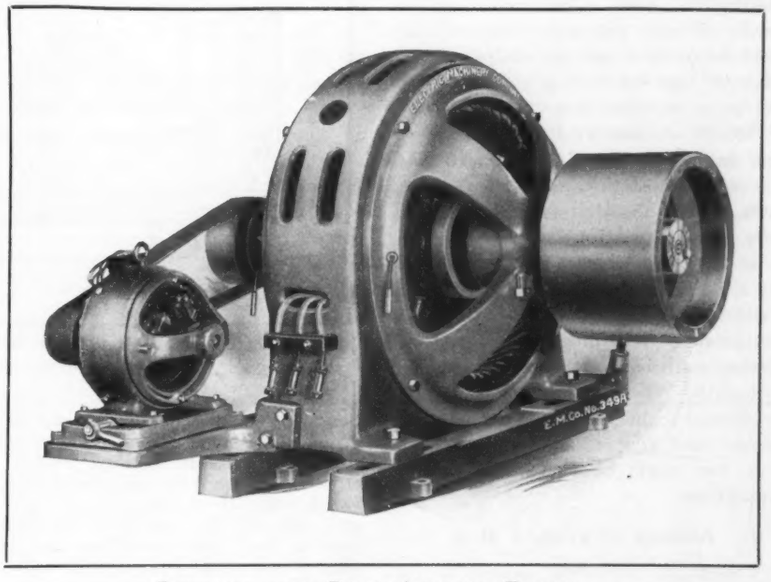
The cage is mounted back of the hoisting motors and is arranged so that the load is always in full view of the operator. Each hoisting unit is independently controlled by its individual controller located in the hoist cage. By this arrangement the loads handled can be controlled according to the requirements of the work. For example, if the bucket is working in especially soft material, the holding line may be tightened while the bucket is closing, thus preventing the bucket from digging so deeply that it will overflow and scatter the material. The two lever systems of control on the grab bucket machine permit each controller to have a maximum number of steps which allow for an ample amount of resistance to be cut out gradually in starting the loads. This feature minimizes the excessive strains which would ordinarily occur when the motor is started quickly. This system of control is also advantageous in that the bucket can be carefully maneuvered when coarse materials are being handled and which are liable to be caught between the bucket jaws.

A New Line of Generators

The Electric Machinery Co., Minneapolis, manufacturer of direct and alternating current generators and motors, has developed a number of interesting features in the mechanical construction of its machines. In operating alternating generators it is essential to have uniform field excitation, as the greater part of the difficulties arising in the average plant is due to exciter troubles. Instead of using a separate, belt-driven machine to excite the fields of the alternators built by this concern, a direct attached exciter is used. This exciter is placed on a cast iron bracket bolted to the main frame of the alternator and moves with the main machine, which provides at all times the proper belt tension and prevents hot boxes on either machine. In thus placing the exciter on the main frame the belt centers are shorter than usual, but the pulleys used are large and unusually wide. The alternator and its exciter are mounted on separate beds, securely bolted together. This direct-attached exciter insures good regulation and occupies only a small amount of floor space. In case of a breakdown the machine can be belted to a temporary floor exciter.

In these machines the field coils, instead of being bolted or wedged in place, are keyed in position. The iron laminations of the core of the coil extend through the field coil ring and a wedge pin carrying a patent locking spring is inserted to hold the coil firmly in place. This key and pin fastening prevents any possible loosening of the coils when running and at the same time makes them quickly removable.

A generator of this type is shown in the accompanying illustration. These generators are built in sizes from 30 to 180 kilowatts capacity, for operation at from 600 to 1,200 revolutions per minute.



GENERATOR WITH DIRECT-ATTACHED EXCITER

On application of the Cincinnati Iron & Steel Co. and other creditors, the Chattanooga Iron & Wire Works, Chattanooga, Tenn., has been put under a receivership, John S. Fouche being named.

The executive committee of the Cincinnati branch of the National Metal Trades Association at a recent meeting discussed tentative plans for the annual outing of shop employes for some time in July. Last year 30,000 employes attended.

SLACKNESS IN WORK

In the Navy Department Explained By Secretary Winthrop.

An explanation of the causes which have led to the navy department's present embarrassment over the disposition of its skilled navy yard labor is found in a statement made today by Acting Secretary Beekman Winthrop in answer to complaints from various sources that certain navy yards are being discriminated against in the apportionment of naval construction and repair work. After denying that any locality has been discriminated against, Mr. Winthrop pointed out that the new policy of naval administration does not admit of extensive renovation of old vessels, and that the large amount of repair work now done on board ship by the vessel's own enlisted personnel cannot but lead to a steady diminution in the overhauling and other work done at navy yards.

The present extreme slackness in work is due to the fact that the battleship Florida is nearly complete and to the temporary lack of funds which has prevented the department from awarding contracts for the steel necessary to commence work on the New York. The last of this steel, however, was contracted for on May 22, and it is expected that the vessel's keel will be laid within three months. Work will then be provided for at least the greater part of the skilled mechanics now reported idle by the commandants of several navy yards.

Chilled Iron, Shot and Gas Cavities in Castings*

Report of an Investigation to Ascertain the Cause of the Formation of Shot Iron and Chilled Streaks in Gray Iron

By Thomas D. West

In making this investigation, samples were solicited of iron castings containing globules in gas cavities, hard streaks or spots, shot iron solidly encased or white iron intermixed with gray iron. In addition to the samples the following information was requested:

First—The character of the pig iron, scrap, fuel or flux used; also if anything unusual occurred or was observed during the heat; a description of the kind of iron produced, whether soft, medium or hard, and an analysis if possible of both the casting and the defective parts, whether shot or white iron.

Second—A sketch of the casting, showing as far as possible the thickness of the different sections with the locations indicated of the defects of which samples were forwarded.

Third—A description of the method of molding, whether in dry sand, green sand, skin-dried molds or loam, with information regarding the method of gating and pouring the mold.

Fourth—Whether the metal was hot, medium or dull at the time of being tapped and poured, and other information that might be of value in this investigation.

Attempt to Produce Shot.

Losses are frequently caused by such defects as shot, blow-holes, etc., and the greatest annoyance is due to the fact that they suddenly disappear before the source of the difficulty is discovered,

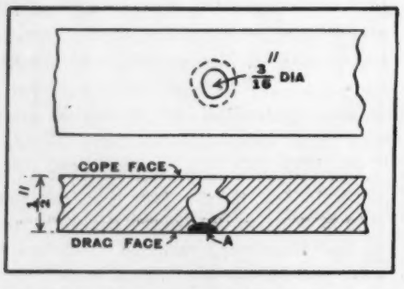


FIG. 1—PLAN AND SECTIONAL VIEWS OF A CASTING CONTAINING SHOT IN THE DRAG FACE AND A BLOW-HOLE EXTENDING THROUGH THE CASTING

thereby eliminating the possibility of guarding against the defects in the future. On this point an interesting communication was received, from which the following is taken:

We note that you desire samples and suggestions regarding the formation of shot in cast iron and believe that, perhaps, some of our experiences will be of interest. From time to time we have had trouble from shot formations in our castings and as much of the work was finished, the tools were quickly dulled by the shot and frequently had to be reground. We have tried almost everything we could think of to prevent this trouble and when it disappeared we never could trace it to any remedy that we had applied. We conceived the idea of making iron shot based on the theory that if we could produce this shot we would also be able to prevent the recurrence of this trouble. Our chemist informed us that the iron spilled in the foundry when charged in the cupola, trickled down through the charge and being insufficiently melted it was mixed with the molten metal, thus forming shot in the castings. We, therefore, placed some of these chiled particles in a ladle with molten iron and poured a number of molds, but were unable to find any shot in the castings. We also tried hard rattling stars, small set screws and pieces of steel, both in the ladle and in the mold, on top of which the iron was poured, but no shot was produced. We then tried wetting the gate of a mold to make it blow, but without result, insofar as shot is cencerned. While the damp, hard sand caused blow-holes, it did not produce shot, and while we carried out every suggestion that might lead to the formation of shot, we were unable to produce it, even under the most favorable conditions. We, therefore, reached the conclusion that shot was formed by something in the iron mixture, and on that basis we will endeavor to effect a cure.

Other letters received related similar experiences. One foundryman was under the impression that the hard iron stars used for cleaning the castings became mixed with the sprues and scrap and it was believed that this was the cause of the shot in the castings. However, after care was exercised to prevent the possibility of the stars from getting into the scrap, the trouble still continued. The general trend of the various experiences reported in these communications would indicate that the introduction of small, chilled particles into the cupola is not responsibe for the formation of shot.

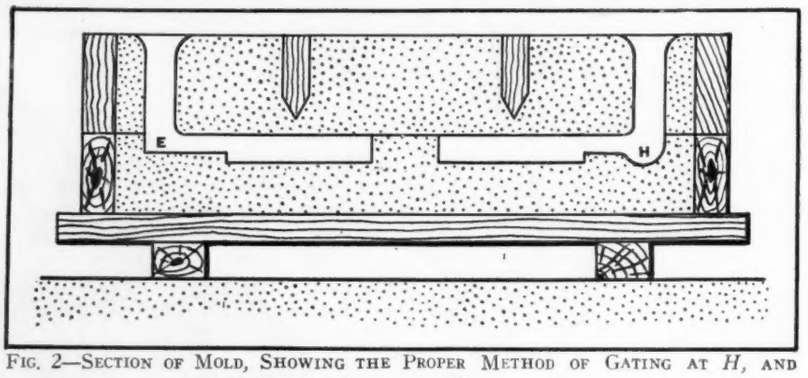


FIG. 2—SECTION OF MOLD, SHOWING THE PROPER METHOD OF GATING AT *H*, AND THE IMPROPER METHOD AT *E*

An Interesting Sample.

The firm whose letter has already been quoted, forwarded a sample of the defective casting containing a small button or shot, loosely embedded in that side of the casting that had been cast downward. The sample showed a crease made by the tool as it was sprung when coming in contact with the hard spot, and also the chisel indentations caused by removing the button from the planed surface of the casting. This sample was exceedingly interesting and a peculiar feature was a small, vertical blow-hole which extended through the casting from the top of the shot to the cope surface and when the shot was removed there was an opening through the casting about ½ inch in thickness. In Fig. 1 is shown a cross-section through the defective part of the casting, showing the blow-hole and the location of the shot. It is evident, therefore, that as the shot was formed on the lower surface of the casting, gas was generated which escaped through the cope, but not sufficiently fast

*Presented at the Pittsburg convention of the American Foundrymen's Association.

to prevent the formation of the blow-hole. It is unfortunate that this sample of hard shot is too small to afford sufficient material for a complete analysis, which would materially aid in the solution of the problem.

White Iron Cemented in Gray Iron.

Several samples of soft iron castings were received containing small bodies of

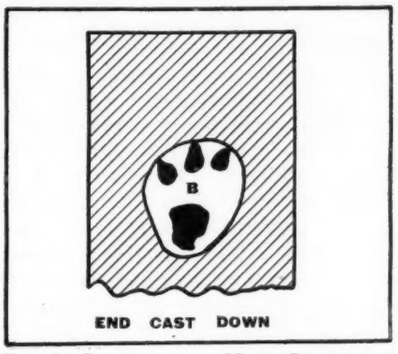


FIG. 3—SECTION OF A MOLD CONTAINING A GAS CAVITY WITH GLOBULES OF IRON AT *B*

strictly white iron, solidly enclosed or cemented therein. The term *cemented* is used because the spots or white bodies are not loose in the casting and are as solidly united as it is possible to unite two different bodies. This defect not only occurs in the form of shot, but also in the form of streaks of considerable size and is found most generally on the surface of the castings uppermost in the mold. Some shot iron was received that had been taken from the cupola spout after the bottom had been dropped. It was the opinion of the party who sent these samples that they were the cause of blow-holes. This shot was tested by placing it on the bottom of an open sand mold, the casting being about ⅜ inch in thickness. While casting, no disturbance of the metal such as would be produced by the escape of gas, was noted, and when the casting was broken it was found to be perfectly solid at the point where the shot had been placed. Tests were also made by placing the shot on the bottom of closed molds, the casting having been poured with hot and with dull iron. In the casting poured with the dull iron a small gas cavity or blow-hole was found directly above the top of the slot. The foundryman who sent this sample of shot stated that no blow-holes were formed in the castings poured from the first part of the heat, which consisted largely of pig iron, but that blow-holes developed toward the end of the heat when the charges were composed largely of scrap. The shot was sufficiently soft to permit it to be slightly flattened in a vise before it cracked. These experiments proved, that aside from the question of blow-holes, cold shot iron, when placed in a thin casting of from ⅛ to ⅜ inch in thickness, is not melted, but is merely enveloped by the metal, and when the casting is broken the shot is found intact. When shot is formed while pouring a casting, the metal in a section under ⅜ inch in thickness will have no melting effect on these small particles if they become chilled below a red heat and, in fact, the shot so formed will have to be near the fusing point to be melted.

Causes of Slot Formation.

A logical theory of the formation of shot in castings is that these small particles are produced by their sudden separation from the general mass of metal during the pouring of a mold and being small, solidify so quickly that the carbon has not sufficient time to assume the graphitic form. The shot is, therefore, hard instead of soft, as would be the case if the time of cooling were extended over the period required for the solidification of the casting. The greater the distance the shot travels before it lodges and the cooler the air through which it passes, the harder it will be. The hardness is also affected by the degree of dampness of the spot upon which the shot may lodge. Where shot is caught and covered by incoming metal before it has time to cool below a red heat, the chances of its being hard are less than when it has had time to cool beyond this point. Particles of shot are formed by the metal striking the sides of a pouring gate or basin and also by falling upon a flat bottom inlet gate, as shown at *E*, Fig. 2. Furthermore, shot may be formed by the metal spattering when it strikes some obstruction in entering the mold.

Flat Bottom Gate.

In ordinary practice there is probably nothing that will cause more spattering and, consequently, the formation of shot than the flat bottom gate. The bottoms of all pouring gates should be dished, as shown at *H*, Fig. 2, and when so constructed there should be little hesitation when pouring is commenced. The first drops of metal fall into the well at the bottom of the gate, where they are retained in liquid form instead of being spattered into shot. When pouring the majority of molds, particularly stove plate, after the stream of metal has once been started its flow should not be stopped, even momentarily, but from the moment the metal strikes the bottom of the gate, a steady and unbroken stream should be maintained, so as to rapidly fill the gate and to keep it full until the mold is filled. This applies to flat top pouring gates generally used on stove plate molds and other similar work, as well as gates of a joint character, shown in Fig. 2. When these suggestions are followed many of the difficulties experienced from shot iron and hard spots in castings will disappear.

Using water too freely on the joint of the mold either before or after drawing the pattern, can easily be productive of hard spots by its chilling effect on

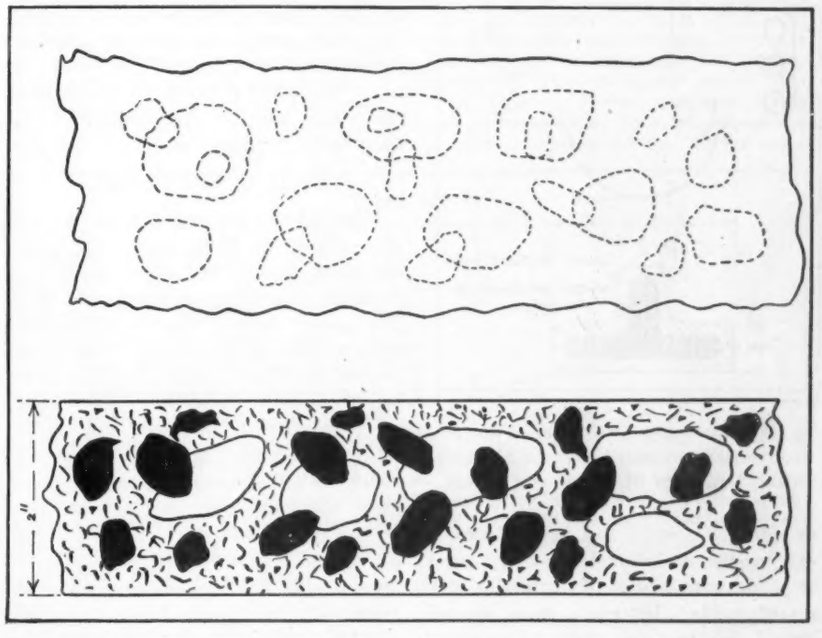


FIG. 4—PLAN AND SECTIONAL VIEW OF CASTING CONTAINING NUMEROUS CAVITIES AND LARGE BUTTONS OF METAL MIXED WITH THE IRON AND DROSS

the iron and a similar effect can be produced by sand that is too wet, hard rammed molds or insufficient venting. These damp sections of the mold are also responsible for the formation of chilled shot, as they cause bubbling and spattering of the iron to a greater or lesser degree. These small particles of iron are chilled and are carried unmelted by the iron to other parts of the mold, producing the white iron or chilled shot so frequently found in castings. While excessive dampness of the sand may not be accountable for all cases of white iron, chilled spots, streaks, etc., found in castings, it is a fruitful source of

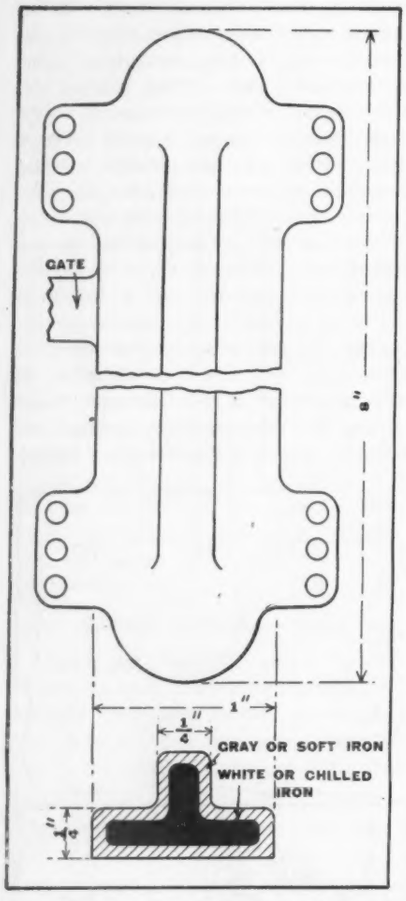


FIG. 5—PLAN AND SECTIONAL VIEW OF CASTING, SHOWING WHITE OR CHILLED IRON INSIDE OF GRAY OR SOFT IRON

such troubles, which can be produced at will by the unskillful use of the swab, by damp sand and hard or insufficiently vented molds. Therefore, many difficulties of this kind can easily be remedied by the skilled and experienced foundryman.

The cause of iron globules in gas cavities or blow-holes, as illustrated in Fig. 3, was the next defect investigated. This emanates from the creation of excessive gas or steam which is imprisoned within a body of solidifying metal and is generally found in the upper parts of castings. Excessive gas, which causes blow-holes, may either arise from the metal itself or may be due to defective molding or pouring methods. The formation of gas in the metal is caused by the reaction of the oxides of manganese or iron on the carbon in the iron, thus producing carbon monoxide gas, or by liberated graphite, forming kish, or indirectly from sulphur by the formation of sulphide of manganese. Gas will also be generated by the combination of oxide and dross and the latter may contain some kish with the dirt from the clay of the cupola, tap hole and spout. This combination of dross and kish forms a slag which floats on top of the ladle and may find its way into the mold as a result of defective skimming, thereby causing the formation of blow-holes, pin-holes and dirt in castings. These defects are also largely due to unskillful methods of molding and the improper handling of the metal.

The use of molding machines materially aids in preventing some of the defects already considered. Their method of operation conforms to the best practice ascertained by experiments made to determine just what conditions are essential to obtain the best results. The operation of molding machines is also less liable to variation than hand molding which reduces the liability of steam and gas cavities and blow-holes, which have their origin in defective molding. These machines, however, do not remove the liability to all of the defects mentioned, nor do they supersede the experienced foundryman.

Cause of Gas Cavities.

Iron globules suspended from the roof of a cavity, as shown at *B*, Fig. 3, are caused by some defect in the method of ramming, gating or pouring the mold. The gases causing these cavities may originate during the filling of the mold or not until some time after the mold has been poured and before the metal has solidified. These gases form a cavity in the metal through the top of which small drops of still partially liquid metal may ooze and thus form the shot or suspended globules, as shown in Fig. 3. Cavities created by gas from the metal or by oxidized splashes of metal should present an unbroken, bright and smooth surface, as the condition that causes the cavities continues to evolve a sufficient pressure of gas in the cavity to prevent the formation of globules. Cavities, therefore, caused by gas evolved from the metal, or by splashes, contain no confined shot, the production of which is enhanced by a lack of pressure, such as would exist when gases are merely imprisoned and cannot increase in volume. Gas cavities may be caused in castings either by the mold or the metal, or both. The mold may cause sufficient bubbling or boiling of the molten metal to cause it to throw off small particles of metal which fall back into the metal in an oxidized condition and the film of oxide on these particles evolves gas which forms blow-holes in addition to those created by the steam which produced the boiling of the metal.

Phosphorus and Sulphur Theory.

It is possible that sulphur or phosphorus may cause the formation of blow-holes, but the author has little faith in this theory, as he cannot recall seeing a blow-hole or gas cavity in a strictly gray iron casting that resulted from any cause other than defective molding. Invariably, defects caused by blow-holes have been overcome when the necessary changes in the methods

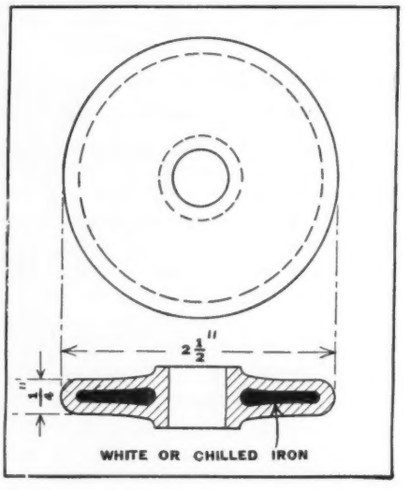


FIG. 6—PLAN AND SECTIONAL VIEW OF ANOTHER CASTING, SHOWING WHITE OR CHILLED IRON INSIDE OF GRAY OR SOFT IRON

of molding were made. In the cases of mixtures of hard or chilling irons, the author is prepared to seriously consider the sulphur and phosphorus theory as the cause of blow-holes in castings, but as to the cause of these defects in soft gray iron castings, he will maintain the position outlined until it has been proven that he is in error.

A letter received from P. Munnoch, a member of the British Foundrymen's Association, contains some excellent information on the subject of chilled shot in castings, of which the following is taken:

The chief peculiarity noted in connection with chilled shot is that it usually occurs in the upper portion or near the upper surface of a casting. Generally, the shot is small in size and almost round, and in some cases partially and

in others entirely fills the cavity in which it is formed. When broken the fracture varies from gray to white, the latter being extremely hard. In Table I are given the analyses of shot and buttons, and in Table II are given the analyses of the castings from which these particles were taken, arranged according to their phosphorus content. Several of these analyses were given in a paper presented by the writer before the British Foundrymen's Association in 1908. Most of the analyses are from specimens obtained from large castings. My first experience was with gray shot enclosed in small castings, which, on account of their size, yielded only sufficient material for partial analysis and, therefore, were very little different from the casting from which they were obtained. In some cases this shot originated from splashes of metal in the mold produced while pouring. Some large buttons, later obtained, were not caused by splashes but must have liquated from the casting after the greater part of the metal had solidified. The analyses of these buttons were similar to those obtained from phosphoric pig iron. After the metal had solidified it was subjected to hydraulic pressure and when the results of early experiments were submitted to J. E. Stead, he expressed the opinion that the blow-holes were first formed and later became filled with a highly phosphorus liquate. Examinations of castings received from various sources showed that all suffered from this defect to a more or less extent.

Table I.

Analyses of Shot Iron and Buttons.

	White.	White.	Mottled.	Mottled.	Mottled.	Mottled.	Mottled.	Not given.	Not given.	Gray.
				—Fracture—						
Graphitic carbon, per cent.	nil	0.33	1.16	nil	nil	1.68	2.02	2.44	nil	2.45
Combined carbon, per cent.	2.20	2.00	1.25	1.00	....	1.05	0.75	0.76	....	0.85
Silicon, per cent	0.70	0.84	0.93	0.60	0.86	0.93	0.98	1.26	1.14	1.32
Manganese, per cent.....	0.63	0.59	0.48	0.63	....	0.36	0.50	0.45	....	0.43
Phosphorus, per cent.....	5.68	5.45	4.88	4.84	4.64	3.80	3.20	1.92	1.80	1.70
Sulphur, per cent	..	0.06	0.31	....	....	0.021	0.037	0.046	....	0.021
Casting taken from	B	B	B	D	E	C	F	F	E	A

Shot in Cylinder Heads.

Some large cylinder heads for blowing engines furnished many interesting specimens, some several ounces in weight having been obtained. In some cases buttons of different composition were obtained from different parts of the same casting and pieces of different compositions were obtained from the same cavity. The castings from which the specimens were obtained weighed about 10 tons. These castings varied in thickness considerably and the molds were built up largely of cores, some of which were difficult to vent. The castings were square with a circular web and flange extending around the top and the holes were formed in the top flange and were only revealed after a considerable thickness of metal had been machined off. The holes were large and their surfaces were smooth and bright, while in one or two cases oxide and oxide struts were found. The upper surfaces were also smooth with rounded projecting crystals, indicating the rising of gases after a considerable thickness of metal had set at the top of the mo'd. The lower parts of the cavities indicated shrinkage in places, but the bottoms were usually covered with the liquated masses.

Characteristics of Shot Iron.

The buttons were smooth and had a bright, mirror-like surface which was retained after several years' exposure to the acid fumes of a laboratory, and were also rounded on the edges and could not have been very fluid when run. In some cases small shot were partly enclosed by large masses and this, together with the difference in composition, showed that the liquated metal had not all entered the cavity at the same time, but during different periods of solidification. Occasionally, the small shot appeared to have been squeezed into the cavity. The fracture of the gray shot was similar to that of the casting and the fracture of the mottled shot was not unlike the fracture of ordinary mottled iron, while the white shot was similar to white iron with the exception that the outside showed a crystalline appearance in the form of long crystals interlaced and partly covered, in some cases, with a thin layer of graphite. There was, evidently, a contraction of the outer shell or expansion in the interior of the casting set up after the metal was almost solidified and this pressure caused the still liquid portion to be squeezed out from between the interstices of the crystals already formed, into the blow-hole cavity. The analyses of the liquid squeezed out of the low phosphorus forge pig iron are given in Table III.

High Phosphorus Shot.

In this case the exterior is solid and the still liquid metal of the interior is forced out, either by contraction or expansion. With castings this is not the case, but the phosphorus enriched liquid remaining in the spaces between the crystals is forced out when subjected to pressure. The liquid is gradually enriched in phosphorus until the phosphide eutectic containing 6.7 per cent phosphorus, 2 per cent carbon and 91.3 per cent iron, is reached and the amount of phosphorus in these buttons is an indication of the period at which they were formed during solidification. The shot that is similar in phosphorus content to the casting was probably caused by the splashes of the metal and by squeezing out the still liquid metal into previously formed cavities during the solidification of the casting. In the case of high phosphorus shot, the liquid enters the hole after the casting has practically assumed the solid state. The interior of a casting, which is the last portion to become solid, has not been found to contain more phosphorus than the outside of the casting, in fact, when spongy parts occur, the reverse condition sometimes prevails and the phosphorus enriched liquid between the crystals, to some extent, drains into the spongy portion.

Shot From Oxidized Metal.

Generally, the formation of blow-holes and shot are noted particularly in iron that has been oxidized in melting, instances of which can be noted when the first metal from the cupola runs cold, particularly when soft iron is being melted. If this is caught in a ladle and allowed to solidify, it often presents the appearance of a spongy mass full of shot, the holes and shot being coated with oxide and graphite. If some of this metal is left in the bottom of the ladle and hot fluid iron is poured over it, a boiling action follows, and if poured into the molds the castings produced will contain numerous holes of the shot-hole type. Holes of this kind may be either bright or tinted inside and usually contain graphite and particles of oxide in their lower portions.

At blast furnace plants when casting low phosphorus iron into pigs after the metal appears to have solidified on the outside, the portion in the center that is still liquid, squirts out and forms small mounds near the sow end of the pig. This is no doubt due to the compression of the liquid in the interior by the contraction of the outer solidifying portion. This phenomenon is only seen in connection with the casting of the forge variety of pig iron. Holes in the upper part of this grade of iron frequently contain shot and in low phosphorus pig this is usually similar in analysis to the pig iron itself.

In commenting on the valuable researches of Mr. Munnoch, attention should be directed to the fact that castings from which the specimens were obtained were of variable thickness and weighed about 10 tons and that the molds were largely built-up of cores and were difficult to vent. In view of these facts it is the opinion of the author that

Table II.

Analyses of Castings From Which the Shot in Table I Were Taken.

	A.	B.	C.	D.	E.	F.
Graphitic carbon, per cent.....	2.74	2.80	2.90	3.25	2.80	2.85
Combined carbon, per cent.....	0.62	0.50	0.40	0.05	0 60	0.60
Silicon, per cent	1.63	1.72	1.70	1.77	1.95	1.65
Manganese, per cent	0.51	0.49	0.45	0.44	0.48	0.49
Phosphorus, per cent	0.88	0.83	0.89	1.23	0.95	0.84
Sulphur, per cent	0.091	0.118	0.114	0.107	0.105	0.119

With the exception of F, which was a pedestal, all the analyses in Table II were made from samples taken from cylinder heads.

these buttons, shot and gas cavities were caused by the molds and that the metal had practically nothing to do with their creation. To be more explicit, if the molds in which these castings were made had been poured with metal at the proper temperature, through well-constructed skin gates, without a hesitation in the pouring as the mold filled and if suitable provision had been made for feeding the casting, I venture to say that not a single gas cavity or button of metal would have been found in any of these castings. Mr. Munnoch obtained some very large specimens of shot or buttons which could have easily been created by the bubbling of the metal in the mold. To demonstrate this it is only necessary to watch the action of a blowing mold. The metal will be splashed in the air 3 or more feet, if the risers and feeding heads are blown, or if the mold is left open the metal will boil under the influence of the explosion of the imprisoned steam and gases. As the metal falls back it can readily be conceived how very large globules or buttons could be formed by small bodies of metal lodging on flat planes, projecting bodies, flanges, etc. These buttons having become oxidized or covered with dross, would, naturally, create gas cavities in the liquid metal with which they are surrounded.

A study of these gas cavities shows them to be of two kinds, namely, those made by the gas created by an embedded button or shot and those due entirely to gases and steam created by the mold or its cores and which form cavities, into which particles of the surrounding metal have been forced in the form of shot. A perplexing feature is Mr. Munnoch's discovery of the difference in the chemical contents of two buttons found in the same cavity and this, no doubt, will invite further study of this subject along these lines.

Shot Caused by Improper Gate.

One letter received from a concern in California stated that a large retort casting had been rejected because it contained numerous cavities and large buttons of metal mixed with masses of dross in the cope side of the casting. A section of a sample of this casting containing these defects is shown in Fig. 4. After an investigation the conclusion was reached that the trouble was due entirely to the method of gating, which permitted the metal to rush into the green sand mold and impinge on a wall of sand, which, until the depth of the metal in the mold had reached the level of the gate, and thereby retarded its cutting action, scattered the iron in all directions in the form of shot. This was mixed with dross and dirt cut away from the mold and was carried out on the rising surface of the metal, and was ultimately deposited in some horizontal plane of the casting.

Iron Shot and Light Work.

The statement, that, as a rule, the molds are more responsible for the creation of blow-holes than the iron, etc., is not to be taken as conveying the opinion that no trouble is to be feared from the gases evolved by the metal, but it is the author's contention that this is a feature for which the management is largely responsible, and can be guarded against to a large extent, as well as the evils arising from defective molding. A metal that is dangerously loaded with oxide of iron is readily discerned by the experienced foundryman.

Table III.

Analyses of Forge Iron and Portion Liquated Therefrom Under Pressure.

	Pig iron.	Liquate.
Graphitic carbon, per cent..	3.06	3.30
Combined carbon, per cent..	0.78	0.58
Silicon, per cent.....	1.23	1.30
Manganese, per cent.....	0.78	0.82
Phosphorus, per cent.....	0.043	0.046
Sulphur, per cent.....	0.091	0.034

Light work, as a rule, suffers more from oxidizing conditions of melting than heavy work and foundrymen who handle light castings experience considerable trouble from hard spots, streaks and pin holes in their castings, due to this cause. The action of oxides in iron is similar to that of excessive sulphur, as it reduces the fluidity and causes the metal to become sluggish. Melting iron dull oxidizes it to a greater extent than melting it hot, as the higher temperature causes the metal to drop more quickly through the fuel from the point at which it melts to the bath on the hearth. Manganese and silicon by reason of their greater fluidity aid in the removal of oxygen and in the formation of a protecting layer of fluid slag.

For oxidizing and purifying the iron a number of alloys are now manufactured which can be obtained in a ferro form and are best charged by placing them in the bottom of the ladle on top of which the metal is tapped. The quantity of this alloy to be used will depend on the character of the pig iron and scrap melted. Ferro-manganese, ferro-silicon and ferro-phosphorus containing, respectively, 80 per cent, 50 per cent and 20 per cent of manganese, silicon and phosphorus, may be used in proportions of from ¼ to 1 per cent in the ladle. Phosphorus acts as a scavenger by reason of its effect in increasing the fluidity of the iron, thereby permitting the escape of sulphur and occluded gases.

The occurrence of the inside chill or white iron inside of gray iron or soft iron, must be classed among the strange phenomena involved in the founding of metals and which, to the author's knowledge, has never been satisfactorily explained. While this phenomenon is of comparatively rare occurrence, it is of importance that a solution of the difficulty be found, and, as an aid to this end, the author solicits the experiences and views of others on this subject, as well as on other points treated in this paper.

Topping's Statement

Announcement by the Republic Iron & Steel Co., that it has determined upon a more aggressive sales policy because it has not been able to secure what it regards as a fair proportion of the current tonnage in view of the irregularities in iron and steel bar prices, represents the most important break that has taken place since 1908 in the co-operative movement of iron and steel manufacturers. The significance of this development pertains chiefly to the bar market, in which this company is a large producer. Since in some directions it has been considered that steel bar prices have been out of line with other steel products, it is problematical whether this action will affect other finished lines. Other steel bar makers, of course, are expected to follow the Republic company in any reasonable price cuts it may put into effect.

Chairman E. H. Gary, of the United States Steel Corporation, in a statement given out Wednesday afternoon, discussing the situation, said:

I have seen the statement published by John A. Topping, chairman of the Republic Iron & Steel Co. board, and have consulted with many of the prominent and representative men connected with the steel industry. Just what the outcome will be I cannot say at this time. I believe, however, that the friendly and co-operative relations which have heretofore existed will be continued by the steel interests generally. Our principles and policies have heretofore been stated and published. I cannot be more specific for the present.

The statement of John A. Topping, chairman of the board of the Republic Iron & Steel Co., making public the decision of his company, was given out at New York, Wednesday afternoon, following a meeting of the board of directors of the company. It declares: "That on account of the low prices on iron and steel bars being made by some of the small manufacturers, his company has been unable to secure what it regards as a fair proportion of the current tonnage, and has been unable to maintain economical operations on that account. Therefore, the board has determined on a more aggressive sales policy."

IRON AND STEEL SECURITIES

Business was quieter on the New York stock exchange last week, and the general list showed resistance against the depressing effect of a break in Steel common, caused by the price cutting reports. Bonds were generally firm.

Prices opened Monday strong and higher, but the close was only fractionally changed; better crop reports weakened the price of wheat; cotton closed higher. Tuesday, Steel common furnished one-third of the entire trading on the New York exchange, and while under pressure all day, at the close it recovered part of the loss; the rest of the list rallied and closed firm; wheat advanced Market turned weak Wednesday and under the lead of Steel common closed lower; Pittsburg Coal preferred and American Can preferred advanced to the highest prices of the year. Steel common on Thursday was again under heavy pressure, following the announcement of the Republic Iron & Steel Co.'s price cutting policy of the day previous; Union Pacific sold $25,000,000 bonds on a subsidiary line; Pittsburg Coal preferred advanced to the highest price since 1903. Price movements on Friday were narrow, and the market was dull; Harbison-Walker preferred advanced to the highest price ever quoted; grain markets were firm, but cotton slightly lower. Stocks were dull Saturday, and the number of shares changing hands was small.

Call money ranged during the week from 2½ to 2 per cent; time money, which had opened the week firm, failed to hold the advanced rates, and at the close dullness prevailed. The actual condition of clearing house banks showed loans increased $1,529,600; deposits decreased $301,400; reserve decreased $2,923,100; surplus decreased $2,842,725, and the percentage of reserve 28.20, compared with 28.42 the previous week. Non-member banks and trust companies showed loans increasd $7,650,300; net deposits increased $7,578,000; reserve, increased $1,804,000, and the percentage of reserve 17.8, compared with 17.7 the previous week. Commercial failures for the week were 240, compared with 253 the preceding week, and 225 the corresponding week last year.

	Closing Quo. May 27	Changes in week	Annual Meeting daoe 1911		Stock Outstanding	Basis	Dividend Last Dividend	Dividend Date Last Div. Pay.
Allis-Chalmers	8⅛	+ ⅛			$19,820,000			
Allis-Chalmers, pr	31	+1	Nov.	2	16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	12⅛	+ ⅜	Feb.	1	41,233,300		1¾ Q.	
American Can, pr	87¾	+1⅜			41,233,300	7 cum.	1¼ Q.	July, 1911
Am. Car & Fdy	55½	— ⅜	June	29	30,000,000		½ Q.	Apr., 1911
Am. Car & Fdy., pr	120	+1			30,000,000	n. c.	1¾ Q.	Apr., 1911
American Loc	41¼	—1¼	Oct.	17	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	108¼	+1¼			25,000,000	7 cum.	1¾ Q.	Apr., 1911
American Ship	68⅜	.....	Oct.	11	7,600,000	4	2 Q. **	June, 1911
American Ship, pr	111	.....			7,900,000	7 cum.	1¾ Q.	Apr., 1911
Am. Steel Foundries	43¾	— ¾	Dec.	7	17,184,000		1 Q.	May, 1911
Barney & Smith	20	.....	June	6	2,000,000	4	1 Q.	Dec., 1907
Barney & Smith, pr	87	.....			2,500,000	8 cum.	2 Q.	Mar., 1911
Bethlehem Steel	33⅛	— ⅝	April	4	14,862,000			
Bethlehem Steel, pr	63½	.....			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	45	—1	Mar.	21	45,000,000	5	1¾ Q.	May, 1911
Cambria Iron	44	—1			8,468,000*	4	2 S. A.	Apr., 1911
Chicago Pneumatic Tool	51¼	—1¼	Feb.	20	6,485,800	4	1 Q.	Apr., 1911
Colorado Fuel	33⅝	— ⅛	Oct.	16	34,235,500		1¾ Q.	Apr., 1902
Crucible Steel	13¼	— ⅜	Oct.	18	24,578,400		3½.	
Crucible Steel, pr	81⅜	— ½			24,463,500	7 cum.	1¾ Q.	June, 1911
Empire Steel	5	.....	Feb.	22	1,254,770			
Empire Steel, pr	50	.....			2,500,000	6 cum.	2 S. A.	Jan., 1911
Fay & Egan	70	.....	Feb.	21	1,000,000	6 cum.	3 S. A.	Feb., 1909
Fay & Egan, pr	110	.....			1,000,000	7 cum.	1¾ Q.	Feb., 1911
General Electric	164½	+4⅜	May	9	65,179,600	8	2 Q.	July, 1911
Harbison-Walker	41	.....	Jan.	16	18,000,000		½ Q.	June, 1911
Harbison-Walker, pr	101	+5			9,600,000	6 cum.	1½ Q.	Apr., 1911
International Pump	39⅝	—1	Dec.	12	17,762,500		1 Q.	Nov., 1910
International Pump, pr	88	— ⅞			11,350,000	6 cum.	1½ Q.	May, 1911
Lackawanna Steel	44	.....	Mar.	8	34,978,000			
Lake Sup. Corp	28⅞	— ⅜	Oct.	4	40,000,000			
New York Air Brake	71¼	—3¼	Mar.	8	10,000,000	5	1½ Q.	Apr., 1911
Niles-Bement-Pond	94	.....	Feb.	8	8,500,000	6	1½ Q.	June, 1911
Niles-Bement-Pond, pr	104	.....			2,000,000	6 cum.	1½ Q.	May, 1911
Otis Elevator Co	72½	+4½	Mar.	20	6,375,000	3	2 S. A.	Apr., 1911
Otis Elevator Co., pr	99½	— ¼			6,310,000	6 n. c.	1½ Q.	Apr., 1911
Pa. Steel	60	.....	May	8	10,750,000			
Pa. Steel, pr	106½	+ ¼			16,500,000	7 n. c.	3½ S. A.	May, 1911
Pittsburg Coal Co	21⅜	+ ⅜	Feb.	10	28,104,600			
Pittsburg Coal Co., pr	85	+4¾			27,071,800	7 cum.	1¾ Q.	Apr., 1911
Pressed Steel Car	35⅛	— ⅜	Feb.	15	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	100	—1			12,500,000	7 n. c.	1¾ Q.	May, 1911
Pullman	161½	— ½	Nov.	8	120,000,000	8	2 Q.	May, 1911
Railway Stl. Spring	35½	+1¼	Mar.	2	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	102	+ ½			13,500,000	7 cum.	1¾ Q.	June, 1911
Rep. Iron & Steel	30⅞	— ⅜	Oct.	18	27,191,000			
Rep. Iron & Steel, pr	93¼	—2¾			25,000,000	7 cum.	1¾ Q.	July, 1911
Sloss-Sheffield	51½	—1	Mar.	15	10,000,000	5	1¼ Q.	Sept., 1910
Sloss-Sheffield, pr	112	.....			6,700,000	7 n. c.	1¾ Q.	Apr., 1911
U. S. Pipe & Fdy. Co	18	+ ½	June	28	12,106,300	2	1 Q.	Dec., 1910
U. S. Pipe & Fdy. Co., pr	57⅛	—1¼			12,106,300	7 n. c.	1¼ Q.	June, 1911
U. S. Steel	78⅜	—2	April	17	508,302,500	5	1¼ Q.	June, 1911
U. S. Steel, pr	119	—1			360,281,100	7 cum.	1¾ Q.	May, 1911
U. S. Steel, 5s	106	— ⅛			463,798,000	5		
Va. Iron, Coal & Coke	62	.....	Sept.	19	9,073,680		5. †	Oct., 1907
Westinghouse Electric	77½	+3¾	July	26	3,998,700*		1¾ Q.	July, 1911
Westinghouse Air Brake	149½	+ ½	Oct.	3	13,750,000*		5 Q. ‡	Apr., 1911

Par value of shares, $100, except those starred (*), $50.
**Includes last 1 per cent payment of 4 per cent extra.
†Stock.
‡Includes 2½ regular, 1½ extra and 1 special.**

Bank clearings for the week showed a decrease of 7 per cent from the preceding week, and an increase of 1 per cent over last year. Shares were sold to the number of 2,529,950, compared with 3,634,600 the preceding week, and 2,033,250 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $15,390,000, compared with $18,619,000 the preceding week, and $6,274,000 the corresponding week last year.

Copper Stocks.

New York. — Amalgamated Copper closed 67, a net loss of ⅜.

Boston. — Butte coalition closed 19½, unchanged; Calumet & Arizona closed 56½, a net gain of 4¾; Calumet & Hecla closed 474, a net gain of 1; North Butte Mining closed 33¼, a net gain of 1½; Quincy Mining closed 71½, a net gain of 1.

Financial Notes.

The American Can Co. has declared the usual quarterly dividend of 1¼ per cent on preferred stock, payable July 1.

United States Cast Iron Pipe & Foundry Co. has declared the regular quarterly dividend of 1¼ per cent on preferred stock, payable June 1.

THE IRON TRADE REVIEW

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

April, 1910	5,793
May	5,827
June	5,842
July	5,864
August	5,875
September	5,895
October	5,955
November	5,993
December	6,026
January, 1911	6,058
February	6,072
March	6,091
April	6,108

June 1, 1911

New Record for Exports

April exports of iron and steel products made new records for a month, the weight of the tonnage lines exported, including scrap, pig iron, rolled material, wire, etc., being 227,834 gross tons, 12,163 tons in excess of the exports in March, which had made a new record by 60,946 tons, while the value of all iron and steel exports in April, including machinery, hardware, etc., was $24,917,056, exceeding by $2,325,208 the value in March, which previously held the record.

A sudden increase in tonnage exports occurred last November, which will be brought out by the following comparison, showing monthly average exports in years preceding 1910, with the average in the first 10 months of 1910 and the monthly figures since then:

Exports of tonnage lines:

Monthly average during	Gross tons.
1907	108,498
1908	80,354
1909	103,622
First 10 months, 1910	121,131
November, 1910	154,725
December	149,666
January, 1911	152,144
February	150,704
March	215,671
April	227,834

Thus in round figures the best monthly average in a calendar year prior to 1910 was less than 110,000 tons; in the first 10 months of 1910 the average was about 120,000 tons; in the next four months it was 150,000 tons, and in the next two months it was more than 220,000 tons. The April exports were 108 per cent greater than the best monthly average of a year prior to 1910.

The value of all iron and steel exports, including the tonnage lines covered above, together with hardware, machinery, cutlery, etc., has been as follows:

1907	$197,060,781
1908	151,113,114
1909	147,680,331
1910	201,271,903
January, 1911	18,739,961
February	18,690,792
March	22,591,848
April	24,917,056

While the tonnage exports in 1910 were much in excess of those in 1907, the value of all exports showed only a slight increase. The monthly average in 1910 was less than $17,000,000, while the value in April was approximately $25,000,000, so that the value of iron and steel exports in April was approximately one-half greater than the monthly average in any calendar year. The gain in value, in point of percentage, is much less than the gain in tonnage, for the reason that exports outside of the tonnage lines gained little, if any, while the value per unit of tonnage lines probably decreased slightly.

Pig iron, scrap and billets showed slight decreases in April as compared with March, while rails showed an increase of 12,000 tons, to 54,182 tons. As the increase in the total of tonnage lines in April was 12,163 tons, rails may be said to have represented the increase, but the losses in scrap, pig iron and billets were made up by increased exports of the more finished lines. Structural material, for instance, increased 3,000 tons, to 19,426 tons.

One Way of Hampering

Railroads in the United States will not accept an export shipment from a manufacturer at any interior point, and agree to deliver the goods at the seaboard at or before a specified date, to reach a steamer sailing for a foreign port. This is one of the greatest obstacles in the way of the manufacturer who seeks to build up export trade. Traffic officials of the railroads are eager in soliciting export shipments, and promise to use their best efforts in having these shipments forwarded promptly, but no matter how much time the manufacturer may allow for a car to reach the seaboard, the railroad will not actually agree to make delivery for "specific sailing"; that is, for a steamer sailing at a date previously announced. Space on ocean steamers is usually contracted in advance of sailing. The manufacturer cannot take the risk of buying space when he does not know whether his shipment will arrive at the port in time, and, if he waits until after it arrives, the vessel may be fully loaded or reserved. This uncertainty in transportation facilities has far reaching results in restricting the efforts of American industries in building up their foreign trade.

Conditions are different in Europe. Transportation facilities are organized there on a co-operative basis, which is of enormous advantage in promoting foreign trade. A buyer in Cleveland, Cape Town or Melbourne can write or cable an order to a European manufacturer, and specify that the goods are to be shipped by a steamer sailing at a future date. If the order is accepted, the buyer knows in advance when his goods will arrive. He can make sales

before arrival, with confidence that he will be able to make deliveries, and in the case of a large shipment, can make definite arrangements for taking up the drafts or financing the transaction. If for any reason the manufacturer has been unable to make shipment by the steamer specified, the buyer is advised by what steamer to expect the goods. Reliable transportation facilities enable the buyer to look forward and make his purchases and plans on a definite basis.

The dry goods importer in Chicago or St. Louis can cable orders to Manchester, Paris or Chemnitz and rely upon delivery in about three weeks from the date specified for shipment from the European factory. Goods shipped by freight from Paris have been displayed in show windows in Chicago the 12th day after the shipment left Paris, but the usual time is about three weeks. The manufacturer in an interior city in Europe has no difficulty in making shipments for "specific sailing". The railroads give careful attention to the business, and require only one or two days, according to distance, to place the goods on board the waiting steamer. The railroads at New York, Boston or Philadelphia have been educated to give prompt attention to this import traffic. They run fast merchandise trains which reach the Mississippi river in four days or less. They do not lose any shipments, nor leave cars standing indefinitely at some intermediate point.

On the other hand, an importer in Europe or Cape Town, who buys American flour or machinery, cannot predict within three months the date when his shipment will arrive. A car shipped from an interior point may arrive at the seaboard in a week, and again it may be a month on the way, or even two months. After it arrives at the port, the monthly steamer may have just sailed, and the one sailing the next month may be booked in advance. A leading Pittsburg manufacturer of machinery makes a practice of sending a man along with any important export shipment, to watch the car personally on the way and see that the shipment arrives at New York and is safely loaded on the steamer for its foreign destination.

Chicago meat packers land their meats at Liverpool in ten days after the cars leave Chicago. They are able to collect heavy damage claims for any meats that spoil through delays or mistakes in transit, and the operating officials of the railroads have been educated to see that there are no delays. The miller who exports flour finds that his shipments require all the way from a month to five months to traverse the same route. The manufacturer of machinery or farm implements has about the same experience, unless he has an unusually well organized traffic department.

The trouble is not due to any criminal neglect on the part of the railroads. Their business is so large that, as a rule, they have to handle traffic in the mass, without giving any one shipment special attention. The dry goods importers, the meat packers and a few other large interests have been able, however, to get their traffic singled out from the mass, so that it receives special attention. The operating officials of the roads are much opposed to giving this special attention to any line of traffic, because it means a little more expense in handling the business. They only yield under pressure to demands that any traffic be given preference in movement, as it is cheaper to operate a road when cars can be forwarded at the convenience of the dispatchers and yard men; or repaired, if in "bad order", when the repair men get around in the course of their work.

It seems that the Interstate Commerce law would not permit a railroad to accept an export shipment for "specific sailing" and pay a damage claim if it failed to reach the specified steamer. While no railroad has ever been prosecuted for paying such a claim, it is possible that the courts or a jury might decide it was a "rebate", especially if the claim were paid to a large corporation. This affords to the traffic officials and agents a sufficient excuse for refusing to accept business for specific sailing. Exporting manufacturers, meantime, have done nothing to overcome this technical point of law, and their business is dragging along in the old, uncertain way. The foreign buyer prefers to do business in a manner that conforms with his convenience or necessities, and he will discriminate against the American manufacturer as long as our transportation of export shipments is handled in this slipshod and archaic manner.

It would seem that no organized effort has ever been made by exporting manufacturers to obtain, by conference with the railroads, the attention which export shipments should receive. Railroad officials are usually willing to meet half way any discussion or movement that will promote traffic for them. The legal obstacle is not a serious one, as it would not be necessary for the carriers to enter into contracts for specific sailing. If each yard foreman, freight dispatcher, car clerk and repair crew along the line understood that export cars must be kept moving, the manufacturer could safely make contracts with steamship lines, and the foreign buyer would soon learn that he could rely upon deliveries from American manufacturers.

New Producing Plant

The Norton Grinding Co., Worcester, Mass., announces that its new electric furnace plant at Chippewa, Can., which was completed about six months ago, is now producing four tons of carbide of silicon daily. The carbide is in the form of crystals and will be sold under the registered trade name, Crystolon. The Norton company announces that with the addition of Crystolon to Alundum, it now has a line of artificial abrasives adequate for every possible grinding or polishing operation.

The shops of the Koken Iron Works, St. Louis, with a bridge building plant at Manchester, Mo., with 10,000 tons annual capacity, and including five acres of a site, have been taken over by the American Bridge Co.

The Ideal Valve Grinder Co. has been incorporated at Los Angeles with a capital stock of $20,000, all paid up. The incorporators are N. E. Meredith, L. H. Schwaebe and I. A. Lothian.

Northwestern Malleable Iron Co., Milwaukee, has started construction of a shipping room 83 x 196 feet, to be used exclusively for finishing and shipping purposes.

The Northwestern Iron Co., Mayville, Wis., advises that instead of the new stack A being blown out recently, it was B stack which was blown out for partial relining.

Gates Advocates an Open Market For All

In Testimony Before Congressional Committee — Gives His Version of Purchase of Tennessee Company for the Steel Corporation

Interesting history and much inside information concerning the conditions in the iron and steel industry of the country, which had preceded the formation of the United States Steel Corporation in 1901, were related in the words of one who was a leading figure in these events and subsequent negotiations, when John W. Gates testified at Washington, Saturday, May 27, before the Stanley congressional committee, appointed to investigate the formation, scope and operation of the Steel Corporation. Mr. Gates was before the committee for a period of more than four hours, and gave his testimony freely and frankly, in answer to the questions of the different investigators, declining to reply only at times to such interrogation as touched upon very personal grounds or required the expression of individual opinion as to the motives and acts of some of those who are to appear later before the committee. The hearing was the first public session of the committee, its Wednesday and Thursday meetings having been secret.

There were present at the sitting, Congressmen Augustus O. Stanley, of Kentucky, chairman; Daniel McGillicuddy, of Maine; Charles L. Bartlett, of Georgia; Jack Beall, of Texas; H. Olin Young, of Michigan, and Henry G. Danforth, of New York. Congressmen Martin W. Littleton, of New York, and John A. Sterling, of Illinois, the remaining members of the committee, were absent.

Declares for Open Market.

In view of the recent developments in the iron and steel market, whereby the Republic Iron & Steel Co. had declared its purpose to act apart from any co-operative methods, the remarks of Mr. Gates before the investigating committee as to his faith in open market selling, possessed much immediate trade significance. "My position in the iron and steel trade is well known; I have always been an advocate of the open shop or open market in selling," said Mr. Gates. "I would rather have open business and be able to run plants full than to have a fictitious market when we can only run the mills 40 to 50 per cent. That has always been my idea and it is today. I believe in the survival of the fittest."

Later, at the request of Chairman Stanley, Mr. Gates amplified his remarks somewhat upon this point. He said it was very important in iron and steel manufacturing to be able to select rolling orders so that the mills could run for a considerable period of time on one size of bars or other material, thereby reducing the number of changes in the rolls, which would be necessary to fill a miscellaneous assortment of orders. Where it is possible to run the mills for 24 hours on one size, a cheaper product is gained and this means a cheaper cost, the witness said. "The mill that can select its orders, getting the largest orders of any one size, will always run cheapest," said Mr. Gates.

Has No Price Agreements.

Mr. Gates was asked if the Republic Iron & Steel Co. had made any agreements with the United States Steel Corporation for the upholding of prices. He replied that he had anticipated such a question from the committee and two days prior to his appearance before the committee he had asked the chairman of the Republic Iron & Steel Co. if in any way, the company had entered into price agreements with the United States Steel Corporation and had been assured that it had not. Mr. Gates declared that he had never had anything to do with any agreements with the Corporation and that he had not attended a meeting of steel manufacturers in 11 years.

"Such a condition as an open market doesn't exist today," interpolated Chairman Stanley, at one point in the hearing.

"It does," replied Mr. Gates. He added he didn't think any price agreement or any nature of an agreement existed today on wire, wire rods, rails, billets or any other material.

Mr. Gates gave a most interesting narrative as to the conditions that existed in the iron and steel industry immediately preceding the formation of the United States Steel Corporation and the personal details surrounding the way in which the merger was brought about.

Million Lost on Option.

In 1896 or 1897, conditions in the finished steel market had become demoralized and H. C. Frick, W. H. Moore and colleagues conceived the idea of taking an option on the Carnegie Steel Co., which was given to them by Andrew Carnegie for a million dollars cash at the sale price of $160,000,000. The demoralization became so great in the market that the deal fell through and Carnegie took the million dollars put up for the option. "In 1899 or 1900," said the witness, "Mr. Morgan organized the National Tube Co. by acquiring the stock of the National Tube Co., the Riverside Steel Co., near Wheeling, and other tube works. Carnegie said he would build a railroad from his Pittsburg works and also a tube mill at Ashtabula, O. Hill and Morgan dined together and the latter expressed the fear that if Carnegie went into the railroad business, he would demoralize it, and that if he built a tube works, he would also demoralize the tube market. After considering the situation, Hill suggested that Morgan talk with me, but the latter said he was not very friendly with me. Hill finally asked me if I would come and talk over the situation. We had the talk and Morgan asked me how I would suggest stopping Carnegie from building the railroad and tube works. I told him that in my opinion only one man in the country had any influence with Carnegie and that was Charles M. Schwab.

Schwab Turns the Trade.

"Morgan then asked me to get Schwab to a conference and suggested it be held in Philadelphia at the Bellevue hotel. I called Schwab and asked him if he would come to Philadelphia for an important conference, and he said he would leave that night. The next day was very stormy and Morgan called up my son and asked him to get me to bring Schwab to New York, as he (Morgan) had taken a severe cold and could not leave. I did this and Schwab came to New York and we dined with Morgan. We discussed the possibility of pouring oil upon the troubled waters to save the situation. We remained a number of hours. When we left, a tentative plan had been drawn up for the purpose of getting the various corporations into one concern. Schwab said Carnegie would do as he would suggest. The plan was adopted for a holding company. Then as I understood it, Judge Moore got hold of Carnegie and asked him that if he took bonds to have them cover the National Steel Co. as well, and Carnegie did this. The National Steel Co. was enabled by this to get $50,000,000 more than it was worth, in my opinion,

and we had to stand for it." The actual formation of the United States Steel Corporation was completed within 60 days of this conference, the witness stated.

Tells of Old Agreements.

Mr. Gates referred to price agreements among steel manufacturers in the days before the Sherman anti-trust act He was asked what Morgan meant when he said he feared Carnegie would demoralize the railroad business if he built a railroad, the same as he had demoralized the steel trade. "In those days we had a few agreements," he answered. "The boys would make them and Carnegie would kick them over. In other words, if Frick and I made an agreement in the morning, Carnegie would be pretty sure to break it in the afternoon. In 1887, or 1888, a friend of mine, Harry Smith, purchasing agent of the Missouri, Kansas & Texas, met Carnegie in New York and the latter cut the price on rails by throwing in the track bolts, spikes and angle bars, or about 15 per cent of the cost. Rails were then selling about $35 a ton and there was a rail pool, of which Carnegie was a member. The penalty of cutting prices was enormous; $20 or $25 a ton. I made open charges against Carnegie of cutting rails to the Missouri, Kansas & Texas, but he denied the charge in general and refused to pay the penalty."

Tennessee Syndicate Formed.

Much attention was given by the committee to the circumstances surrounding the sale of the Tennessee Coal, Iron & Railroad Co. to the United States Steel Corporation, in 1907. Mr. Gates gave a very complete recital of the manner in which this deal was made. "In November or December, 1904 or 1905, a syndicate was formed and acquired in the open market and at private sale, a controlling interest in the Tennessee Coal, Iron & Railroad Co. This syndicate was managed by G. B. Schley, of New York, and Chas. S. Guthrie, then president of the Republic Iron & Steel Co. There were about 15 members in this syndicate and I think about 200,000 shares were purchased. Among the members were Col. Oliver H. Payne, J. B. Duke, E. J. Berwind, L. C. Hanna, G. B. Schley, A. N. Brady, G. A. Kessler, E. W. Oglebay, O. Thorne, H. S. Black, W. D. Stout, J. W. Simpson, G. W. French, S. G. Cooper and J. A. Topping. Under the syndicate agreement, the managers had authority to sell the stock without consulting with the members, provided a profit was shown, but not at a loss without the consent of the members. Mr. Guthrie died and L. C. Hanna was made associate syndicate manager to Mr. Schley. We proceeded to improve and operate the company's properties.

Finds Negotiations on.

"I sailed for Europe in July, 1907. On November 6 of the same year, I returned and while on the boat, I read in the papers that the Tennessee Coal, Iron & Railroad Co. had been sold to the United States Steel Corporation. When I reached my hotel in New York, I received a note from Mr. Schley, asking me to call at his office. I did so and found that negotiations were under way with Judge Gary, Frick and Morgan on one side, and Schley, Hanna and associates on the other. I was told that there was a meeting then in progress at Morgan's residence. Gary, Frick and Morgan were trying to acquire the stock by exchanging for it of United States Steel second 5's; in other words, for each ten shares of Tennessee stock, they offered one of second bonds of the Steel Corporation. I said to my colleagues that this was not enough. After further negotiations, the trade was made, as I remember it, on the basis of 119¾ per cent of United States Steel sinking fund seconds selling around 80 for each share of Tennessee stock, or about 96 on the par value of each share of stock. Under the terms of the trade we were to resign as directors in a body, and the Steel Corporation was to substitute such men as it selected. At a meeting at the offices of the Tennessee company at 115 Broadway, New York, the following morning, I said to Judge Gary, 'You are simply buying the majority of the stock and demanding our resignations.' 'Yes,' Gary said, 'we don't care for the minority.' I insisted that the minority holders be treated the same as the majority, and said we would refuse to turn over the stock unless a resolution was passed that the same price be paid the minority holders as the majority. A resolution was then passed to pay the minority on the same basis as the majority stock holders." As to the number of shares held by each member of the syndicate, Mr. Gates said that he and Messrs. Duke, Berwind, Payne and Kessler each had 18,000 shares and his remaining associates in this deal from 3,000 to 9,000 shares each.

Regards it Forced Sale.

Mr. Gates said he regarded the sale of the Tennessee Coal, Iron & Railroad Co. as a forced one and that the property was bought at a bargain price. He said that about a year before the sale Morgan had offered to Kessler 150 for all the Tennessee stock conditioned upon the Steel Corporation ratifying the deal, but that the latter did not agree to the purchase at that time. The stock was quoted in the market then at from 150 to 160. His impression was that when the stock was sold, it was quotable on the exchange at from 120 to 160. At the market value of the Tennessee stock and the Steel bonds at the time of the sale, the witness said the syndicate lost money of from approximately $10 to $15 a share in view of what had been spent for improvements. His own stock cost him about 105, and he said that long before the offer of 150 from Morgan he had been willing to offer from 108 to 110 for additional blocks of the stock. The second mortgage bonds of the Steel Corporation, Mr. Gates said, are practically a promise to pay and there is no part of the securities of the Corporation behind them except the preferred shares. The stock of the Tennessee company, he stated, represented the total equity in the property of the company over and above the bonded indebtedness.

Was Doing Good Business.

Mr. Gates testified that the Tennessee company was doing a good business at the time of the sale. It had just taken an order for 150,000 tons of open-hearth rails from the Harriman lines at an advance of $2 a ton over Bessemer rails. The company was putting in a new and improved rail mill and in all, he estimated that the syndicate had spent from $6,000,000 to $8,000,000 in improving the property. He declared that in the Birmingham district it was possible to assemble the material to make a ton of pig iron today at $9 a ton, under most modern practice, as considerably lower than any other place in this country. No other section of the United States, with which he is acquainted, can produce pig iron at less than $11 a ton, based on the freight rates for assembling material, he said. He explained that the close proximity of the ore and other materials in the Birmingham district enabled them to be assembled to make a ton of pig iron cheaper, in his opinion, than anywhere in the world. Mr. Gates stated it was difficult to estimate the ore resources of the Tennessee company in the Birmingham district, but that they would exceed 300,000,000 tons and might reach 700,000,000 tons and that the coal acreage was enormous.

Tells of Bank Trouble.

Chairman Stanley questioned Mr. Gates as to the report that at the time of the acquisition of the Tennessee company by the Corporation, a large New York banking institution would have failed and a possible panic remained unchecked, if the Steel Corporation, to which this bank had appealed,

had not purchased the large accumulation of Tennessee stock among the assets.

"I am told by steel men and bankers that a certain bank or trust company applied to the clearing house association for assistance and that a committee had been appointed to examine its assets," said the witness. "In the examination the committee found several millions of loans had been made on Tennessee stock as collateral and reported back that too many dollars were loaned on this stock. As a result of the investigation, the gentlemen visited Morgan's house, I have heard, and suggested that he relieve the congestion by the Corporation buying the Tennessee stock. This led to the acquisition of the Tennessee stock."

On later interrogation, Mr. Gates said that the bank in question was the Trust Co. of America, and that the amount of ready money it needed at this time in 1907, was $10,000,000, which it obtained, as stated. He said he did not know that Morgan had anything to do with this bank, for "it is hard to tell where a man's influence begins or ends in Wall street," he added in explanation. Mr. Gates declared that in the exchange of the Tennessee securities for the Steel bonds not a dollar changed hands and no bank received any benefit from the deal.

Tells of Wire Industry.

Recounting his experience in the wire industry, the witness stated the first wire company he was engaged in was the Southern Wire Co. of St. Louis, in 1880. Later, the company acquired and built other works, and the Consolidated Steel & Wire Co. of Illinois was formed, with $4,000,000 capital.

The Consolidated Steel & Wire Co. was finally merged with the American Steel & Wire Co. of Illinois, a $24,000,000 corporation, at about $200 a share, and this in turn was absorbed by the American Steel & Wire Co. of New Jersey, with a capital of $40,000,000 preferred and $40,000,000 common. When the American Steel & Wire Co. became a subsidiary of the Steel Corporation, Mr. Gates testified that he and his associates secured $46,800,000 United States Steel preferred for $40,000,000 preferred of the wire company and between $50,000,000 and $60,000,000 Steel common for the common stock. At the time of its merger into the Steel Corporation, the company controlled from 75 to 85 per cent of the wire business of the country.

Mr. Gates said that his company never had any fear of Carnegie in the wire business, for "it finally bought for $500,000 the wire properties of the latter, in which $1,000,000 had been invested." He also declared that the Rockefeller interests had threatened to put him out of business, but that he had bought them out at 30 cents on the dollar.

Answers Hypothetical Questions.

In reply to hypothetical questions from members of the committee, Mr. Gates said he could conceive the point where the Steel Corporation with its control of transportation facilities of two thirds of the ore from the Lake Superior regions in addition to its ore resources could drive the independents out of business, if it were so disposed, by assessing high freight rates, were it not for the interposition of the Interstate Commerce Commission. "The independents believe the law of equity still exists in the land," he said. He stated that the Steel Corporation's ore roads charge approximately a cent a mile for carrying iron ore to upper lake docks.

Gary Will Testify.

The hearings are being continued this week. Chairman E. H. Gary, of the United States Steel Corporation, is scheduled to appear before the committee Thursday. Other steel makers, who have been called to testify some time during the current week, are W. B. Dickson and James Gayley, former vice presidents of the Steel Corporation; Norman B. Ream, a director of the Corporation, and John Lambert, a director of the Republic Iron & Steel Co.

To Distribute Assets

S. C. Hauxhurst, of Milwaukee, has been appointed receiver for the Brodhead Iron Mining Co. by the Milwaukee county circuit court. The corporation dissolved on May 27, 1908, and it was understood that the affairs would be settled up within three years. Stockholders residing in Milwaukee petitioned for a receiver, as the three years' limit expired, in order to obtain a speedy distribution of the remaining assets. The corporation was capitalized at $1,000,000 and owned acreage and mineral rights in Gogebic county, Mich.

Built Steam Auto

Robert Symmonds, for 11 years general superintendent of the Thomas B. Jeffery Co., Kenosha, Wis., and in charge of the construction of Rambler automobiles since the first models were issued, has resigned and plans to take a long rest. Mr. Symmonds was born in Kenosha, and about 15 years ago built a steam automobile. Later he joined Thomas B. Jeffery and the two built the first Rambler gasoline car.

PRICE REDUCTIONS

In Recent Years—The Cut in 1908 and Slump in 1909.

The action of the Republic Iron & Steel Co. in reducing prices of steel bars, recalls in a striking manner the history of the price reductions of 1908. In spite of the panic of October, 1907, prices of most finished products were well maintained up to the first of June, 1908. On May 21, 1908, manufacturers held a dinner in New York, when it was announced that there was a general feeling of optimism and cheerfulness. A few days later, it was rumored that the Republic and other companies had sold steel bars at 1.40c, a reduction of $4 per ton, and on June 2, Judge Gary issued the following statement:

"Some of the smaller manufacturers of steel bars who have not been in consultation with the larger manufacturers, have for some time been selling steel bars at about 1.40c to meet the bar iron competition, and some of the larger manufacturers have reached the decision that they will meet these conditions when and as required. This conforms to the view of the steel bar committee. It will not affect prices generally, nor interfere with the movement in favor of the stability of business conditions."

On June 10, after a meeting of steel manufacturers, the previous evening, Judge Gary announced the following reduction in prices:

"Billets, from $28 a ton to $25, Pittsburg; sheet bars, from $29 per ton to $27, Pittsburg; plates, from $1.70 per 100 pounds to $1.60, Pittsburg; structural iron, from $1.70 per 100 pounds to $1.60, Pittsburg; merchant pipe, a reduction of 2 points, or $4 per ton, Pittsburg; wire nails, from $2.05 per 100 pounds to $1.95."

During the same week the prices of Lake Superior ores were reduced 50 cents per ton, base, to the same prices as now prevail. Considerable activity in steel bars followed the reduction in prices, but the market in general was not active. Prices were well maintained until Feb., 1909, when the general slump occurred, continuing until mid-summer. Some sales of bars were made as low as 1.05c. Then a revival set in. It should be noted that in June, 1908, prices were on a much higher plane than they are at present, and there was opportunity for greater cuts than will be possible now.

The Hilbert Machine Co., Cincinnati, has increased its capital stock from $15,000 to $50,000.

LIVE MACHINERY NEWS

In New York, the chief event of the week was the awarding of the entire list of requirements for the Saunders Trade School, Yonkers, N. Y. In the same market, the New York Central Railroad Co. has renewed activity on an extensive list of shop equipment which it issued last August. The original list was considerably shortened and at present involves some $75,000. It is expected that the list will be closed before the end of July. In Cleveland, the market in power equipment shows most activity, while machine tools and general equipment continue to be sold in small lots. The Wheeling & Lake Erie railroad recently closed for two machine tools in a list of 10 issued some time ago for shops at Brewster, O. In Chicago, dealers are submitting bids on the two lists issued by the Santa Fe railroad. In Pittsburg, business is extremely quiet. The railroads in that section are showing signs of approaching activity. Competition among Pittsburg crane builders is very keen and some low quotations have been made on small inquiries.

Railroads

The Parker-Harris Co., of Memphis, Tenn., will build an automobile repair plant to cost $40,000. A site has already been secured.

Plans for the proposed terminal of th Buckhannon & Northern Railroad Co., at Morgantown, W. Va., have been prepared and it is expected that bids for a new freight and passenger station and repair shops will be invited shortly.

The Boston & Maine railroad, Henry Bartlett, general mechanical superintendent, Boston, advises that plans for its proposed mechanical department shops have only been outlined so far and that nothing definite has yet been settled.

The Louisville & Nashville railroad, with general offices at Louisville, Ky., which now controls the Lexington & Eastern, will erect shops and terminals for the new extension of the latter road at Jackson, Ky. A ninety-mile line into the Kentucky mountains is now under construction.

The Pittsburg office of the Wisconsin Engine Co. has received an order from the Philadelphia Co., Pittsburg, for a 1,200-horsepower, cross compound, pumping engine with gas cylinder 20 inches in diameter, high pressure cylinder 20 inches, low pressure 48 inches, and stroke 60 inches, to be delivered at one of the West Virginia stations of the Philadelphia Co. in June.

Machine Tools

The entire list of machinery for the Saunders Trade School, Yonkers, N. Y., issued in March, is understood to have been contracted for. The list totaled about $20,000.

The Henry Vogt Machine Co., Louisville, Ky., is asking for prices on a milling machine. It is to be vertical and must have a range of 21 x 12 inches. Several different types will be considered.

The Gisholt Machine Co., Madison, Wis., will erect a new machine shop, 204 x 325 feet, to cost $104,000. A new office structure will also be erected. The company is planning to spend $500,000 in enlarging the plant. The improvements are to be completed by Sept. 1.

The Wheeling & Lake Erie railway, which submitted a list of 10 machine tools for its Brewster, O., shops some time ago, has closed for two of these tools in the Cleveland market. It is not considered likely that the remainder of the list will be closed on in the near future.

The New York Central Railroad Co. has renewed the inquiries submitted to the New York market last August, for an extensive list of shop equipment, and it is believed that it will be awarded before the end of July. The original list was cut down about 25 per cent, the remainder involving a total of about $75,000.

The board of education, Cleveland, has not yet completed the list of machine tools and other equipment for the proposed West Side technical high school. It is not expected to appear before June 15. The officials are now conferring with machine tool manufacturers regarding specifications. The machine tools needed are 72 in number and, in addition, a large quantity of small tools and blacksmith shop apparatus will be called for. A large amount of woodworking equipment will be specified.

New Works

The Reynolds Wire Co., Dixon, Ill., has plans under way for erecting a $75,000 plant at Gouverneur, N. Y. Horace G. Reynolds is president.

The Tel-Electric Piano Player Co. has purchased a plant at Pittsfield, Mass., formerly occupied by the Alden-Sampson Mfg. Co.

The Riverside Bridge Co. has been awarded a contract for the two-story addition to be erected to the plant of the Wheeling Can Co., Wheeling, W. Va.

The Willys-Overland Automobile Co., Toledo, O., has let contract for a five-story plant, 300 x 400 feet. The capacity of the works will be increased to 110 cars daily.

A three-story factory, 60 x 200 feet, will be built by the Oriental Metal Bed Co. on the northwest corner of Clinton and Eighth street, Hoboken, N. J.

The Muncie Gas Engine & Supply Co., Muncie, Ind., advises that it is preparing to erect an addition to its factory which will double the capacity of the plant. The output of oil and gas engines will be increased.

The Milwaukee Electric Railway & Light Co., Milwaukee, has taken out a permit for the erection of a one and two-story repair shop, 180 x 370 feet, on Cold Spring avenue and Fortieth street, that city.

The C. W. Warner Co., Muncie, Ind., is erecting a large plant is Toledo, O., for manufacturing automobile parts. The company also intends to make some changes in its present plant, but has no definite information to give out at this time.

Charles T. Main, Boston, will receive bids in about two weeks for the

erection of a seven-story brass foundry, 64x282 feet, for the Yale & Towne Mfg. Co., at Stamford, Conn. The building will be of steel frame, with concrete floors.

The White Co., manufacturer of automobiles, 205 West End avenue, New York, has leased a plot on Fifty-seventh street, with a frontage of about 246 feet, and will erect a 1½-story garage and shop to cost $40,000. Plans for the building have been filed by Clinton J. Warren, architect, Boston.

Contracts for the equipment for the new plant of the Gary Screw & Bolt Co., a subsidiary of the Pittsburg Screw & Bolt Co., Pittsburg, including cranes and motor driven machinery, will be placed within the next week or so. The Riter-Conley Mfg. Co., Pittsburg, has the contract for the buildings, which will cover an area 360 x 475 feet, and will require 1,200 tons of structural steel.

Power Plant Equipment

Pulaski, Tenn., contemplates the establishment of an electric light plant. H. M. Grigsby is interested.

Mills & Harrington, Faith, S. D., will construct a 100-kilowatt electric light, heat and power plant.

The commanding officer, Rock Island arsenal, Rock Island, Ill., will receive bids until June 6 for an induction motor, polar wound.

Electric pumps, to cost about $16,000, will be installed at the old pump house, Richmond, Va. Charles E. Bolling is city engineer.

Lieut. T. A. Terry, Fort Howard, Md., will receive bids until June 12 for the construction of an electric light plant and lighting system.

Leroy G. Brown, Quincy, Cal., is at the head of a company which will build three power plants on the Feather river.

H. P. Andrews, Red Bluff, Cal., has appropriated 12,000 inches of water for power in Tehama county, Cal., and will install an electric plant.

Bids will be received by Lieut. Col. Chauncey B. Baker, Twenty-sixth street and Gray's Ferry road, Philadelphia, until June 9 for one 200-horsepower water tube boiler.

R. C. Houston, of Memphis, Tenn., is preparing to purchase power machinery, including an electric generator, a cross-compound engine and a gasoline engine. He is also in the market for a pump.

A new boiler-house will be erected and new equipment installed in the electric light plant at Dyersburg, Tenn. J. E. Trout is the engineer in charge. Bids for the new equipment will be opened June 13.

The Ebensburg Coal Co., Colver, Pa., will erect a power plant in connection with its coal properties. The ultimate capacity will be 3,600 horsepower. B. Dawson Coleman, Lebanon, Pa., is president.

The board of education, Cleveland, has completed specifications for the power plant and other electric equipment for the proposed West Side technical high school. Bids will be received until June 13.

The Boundery Reed Mining Co., located in Mojave county, Ariz., will install a compressor plant. The property is controlled by I. D. L. Williams, Los Angeles, Cal., and his associates.

The city of Gallatin, Tenn., rejected bids on May 5 for two generators, two electrically operated pumps and other power equipment. New bids will be called for on changed specifications.

Architect J. Milton Dyer, Cuyahoga building, Cleveland, is preparing plans for a factory and power plant to be erected for the Sunshine Cloak Co., 1242 West Third street, that city. The structure will be 175 x 290 feet and will cost about $300,000.

The Wheeling Electric Co. is building a new power house at Wheeling, W. Va. The contract for the new structure has been awarded to the Riverside Bridge Co., and contracts for the equipment will be placed within a week or so.

The Lanham Hardwood Flooring Co., Louisville, Ky., is to install a power plant, items of equipment to be secured including an engine and boiler of 150 horsepower. The company will substitute its own power for current from a local lighting plant. The machinery is wanted at once.

The Kentucky state board of control of charitable institutions is in the market for three underfeed plunger stokers to be installed in connection with the water-tube boiler equipment at the state asylum for the insane, Lakeland, Ky. Address Albert Scott, president, Lakeland.

The National Biscuit Co. has leased the entire block bounded by Tenth avenue, Fifteenth and Sixteenth and Marginal streets. The company will erect a factory to cost about $1,000,000 on the site. It is believed that the power and heating apparatus requirements will be extensive.

The Kentucky Traction & Terminal Co., Lexington, Ky., which recently took over all of the electric railway properties in and around Lexington, has purchased a two-acre site for the erection of a power house. Work will start as soon as plans can be completed, which will be in the next few weeks. I. L. Oppenheimer is general manager of the company.

Miscellaneous

Forest D. Goody, Ely, Nev., will install a pumping plant.

The secretary to the director of public safety, Cleveland, will receive bids until June 6 for a steam traction ditcher, to be delivered f. o. b. Colony Farm, Warrensville, O.

The board of managers of the Ohio penitentiary, Columbus, O., will receive bids until June 26 for equipment for a stone crushing plant and quarry.

The Eagle Pencil Co., 377 Broadway, New York city, has had plans prepared and filed for the construction of a six-story factory on the south side of Thirteenth street, New York. The building is to be 75 x 103 feet, and will cost about $75,000.

Government News

Bids are invited by the Isthmian canal commission, Washington, until June 15, as follows:

Four trunnions for 60-foot turntable, complete, as per drawings (No. 4506), furnished on application; 2,376,000 feet hard-drawn copper wire, No. 10 B. & S.; 3,000 sleeves for same; 3,000 galvanized cross-arm braces, 26-inch x 1¼ inch x ¼ inch; 3,000 carriage bolts, with nuts and washers, galvanized, 4 inch x ⅜ inch, 1,000 double-arming bolts, 12 inch x ½ inch, 4-inch thread each end; 3,000 washers, square, galvanized, 2-inch, with 9/16-inch hole; 40 steel wire brushes.

Bids are invited by the bureau of supplies and accounts, navy department, Washington, as follows:

Until June 6: 30,000 fire brick, delivery at Brooklyn, schedule 3623; 66,000 pounds fire clay, Brooklyn, schedule 3623; 1,800 square feet asbestos fire felting, Brooklyn, schedule 3631; 60 water gages, Norfolk, schedule 3621; 66 steam gages, Norfolk, schedule 3621; five turbine tube cleaners, Brooklyn, schedule 3621; twelve brass drums, Philadelphia, schedule 3624; 5,500 pounds asbestos millboard, Brooklyn, schedule 3621; miscellaneous emery cloth, Norfolk, schedule 3618; miscellaneous twist drills, Norfolk, schedule 3618; miscellaneous files, Brooklyn and Norfolk, schedule 3618; six 30-inch grindstones, Brooklyn, schedule 3618; 160 brass spur grommets, Boston, schedule 3618; miscellaneous hardware, Brooklyn, schedule 3618; same, schedule 3618; 738 bronze hinges, Norfolk, schedule 3618; 24 rim locks, Norfolk, schedule 3618; 3,900 pounds steel wire nails, Brooklyn, schedule 3618; miscellaneous wire nails, Norfolk, schedule 3618; miscellaneous brass machine nuts, Brooklyn, schedule 3618; seven folding platform scales, Brooklyn, schedule 3618; miscellaneous machine and 817 gross wood screws, Norfolk, schedule 3618; 1,300 pounds bronze rod, Norfolk, schedule 3617; 375,000 pounds ingot copper, various eastern navy yards, schedule 3622; 75,000 pounds zinc boiler plates, Norfolk, schedule 3622; 51,500 pounds sheet zinc, Boston and Philadelphia, schedule 3617; 1,500 pounds spelter, Brooklyn, schedule 3622; 35,000 pounds slab zinc, Brooklyn, schedule 3617.

Until June 20—170 tons foundry coke, Mare Island, Cal., schedule 3628; miscellaneous composition pipe fittings, Puget Sound, schedule 3628; 56,000 pounds ingot tin, Mare Island, schedule 3626; 300 composition globe valves, Puget Sound, schedule 3628.

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

Star Disc Machine Co., Kansas City, Mo.; $10,000; by E. E. Townsend, A. L. Whiteford, J. L. Ballard and others.

Motor Equipment Mfg. Co., Kansas City, Mo.; $10,000; by George B. Maegly, Phil R. Toll, L. L. Seibel and others.

The Warning Sheet Metal Co., Oshosh, Wis.; $25,000; by Charles F. Warning, Freeda Warning and William Warning.

The Parkhurst Die Casting Machine Co., Anderson, Ind.; $100,000; by W. T. Durbin, W. N. Durbin and L. M. Parkhurst.

Charles Hartmann Co., Brooklyn; to manufacture and deal in iron, steel, copper, etc.; $100,000; by C. Hartmann, A. Hartmann and B. W. Bennett, of Brooklyn.

Penn Foundry & Mfg. Co., Basic City, Va.; $120,000; president, A. F. Holliday, Pittsburg; vice president, J. A. Patterson, Waynesboro, Pa.; S. C. Dally, Pittsburg.

Superior Pouring Metals Co., Pittsburg; to manufacture steel; $50,000; by R. Herzog, F. J. Kier, C. D. Scully, A. W. Wall and John T. Stephens, all of Pittsburg.

Willard F. Myers Diamond Saw Co., Bedford, Ind.; $6,000; to manufacture saws for stone cutting purposes; by W. F. Myers, V. A. T. Albright and Gertrude Albright.

The Engineers' Appliance Co., Cleveland; $20,000; to manufacture steam and hydraulic appliances; by J. F. Doolittle, A. P. Fothergill, R. J. Venning, B. F. Silliman and F. R. Evarts.

Electric Welding Co., Pittsburg; $5,000; treasurer, R. A. Cummings, 6203 Stanton avenue, Pittsburg; directors, R. A. Cummings, E. Cummings and J. E. MacCloskey Jr., all of Pittsburg.

Lee Machine Co., New Haven, Conn.; $150,000; to manufacture the Lee steam turbine; by Henry B. Lee, of New London; Winthrop G. Bushnell and Samuel C. Morehouse, of New Haven.

The New York Universal Ball Bearing Co., Manhattan; manufacture machinery, bearings, etc.; $50,000; by J. W. Kurtz and P. E. Clark, both of New York City; M. E. Clark, Bradford, Pa.

International Mfg. Co., Washington, D. C.; to manufacture automobiles and other vehicles; $100,000; by John Ebersole, John B. Flick, Henry M. F. Cunningham, Ross C. Barrett and Howard M. Meldrum, all of Washington.

New Construction:—

The Buffalo Bolt Co., Buffalo, is planning for additions to its Oliver street shops.

The Thomas Mfg. Co., Springfield, O., which contemplates an addition to its gray iron foundry, advises that plans are not yet ready.

Superior Iron & Chemical Co. is building at Manistique, Mich., a new retort and chemical building, the former 180 x 400 feet, and the latter 87 x 187 feet.

The New York Central Iron Works Co., Geneva, N. Y., advises that its engineers are working out details for its proposed new plant at Hagerstown, Md. Further announcement will be made later.

The Standard Brass Casting Co., Oakland, Cal., is erecting a foundry, 100 x 100 feet, at Third and Jefferson streets. It will be equipped with a crane and trolley system and will be occupied about June 1.

The H. M. Bellows Mfg. Co., Columbus, O., has been incorporated by H. M. Bellows and others, with $60,000 capital stock, to manufacture fireplace supplies. An option has been taken on a site in the south side, Columbus.

The work of rebuilding the shops of the Mobile Stove & Pulley Works, Mobile, Ala., is progressing, and the works will be in operation within 60 days. The mounting department has been completed, and several of the smaller buildngs are well under way. Plans for the main building, estimated to cost $25,000, are being drawn.

The C. G. Dauber Machine Co., Oshkosh, Wis., which recently increased its capital stock and changed its name to the Dauber Bell Machine Co., advises that it is adding a concrete and steel building, 46 x 120 feet, for which contracts have been let. It manufactures dowel door, furniture and case shook machinery.

Foote Bros. Gear & Machine Co., 214-20 North Carpenter street, Chicago, is erecting a reinforced concrete building, 31 x 121 feet, three stories. The first floor and basement will be used as a vise room and erecting room, and the second floor for gear cutting machines. It does not expect to buy new equipment, instead planning to install some of its old machinery.

Baldwin, Tuthill & Bolton, manufacturers of machinery for saw-mills and wood-working purposes, Grand Rapids, Mich., are completing a three-story addition, 70 x 85 feet. The necessary equipment has been arranged for. The company is also planning to erect a building, 125 x 160 feet, to replace the present frame structures, and an office building, 25 x 70 feet. It is not likely that the latter two buildings will be erected this year.

General Industrial:—

Galion Iron Works, Galion, O., has increased its capital stock from $100,000 to $150,000.

The General Foundry Co., Warren, O., has increased its capital stock from $58,000 to $125,000.

Ohio Motor Car Co., Carthage, O., has filed notice of its capital increase from $10,000 to $450,000.

The Stevens Mfg. Co., Marinette, Wis., maker of agricultural machinery, is planning to remove to Decatur, Ill.

Martin Krueger has been appointed receiver of the Western Launch & Engine Works, Michigan City, Ind., on application of A. H. Leist, a stockholder.

The Hudson-Sharp Machine Co., Green Bay, Wis., has amended its articles of incorporation decreasing its capital stock from $40,000 to $30,000.

The Acme Brass Foundry Co., Los Angeles, Cal., has been incorporated with a capital of $30,000 by F. K. Czerniski, S. F. Margozewith and others.

William J. Hess, of Manitowoc, Wis., who recently purchased at Green Bay, Wis., the property of a lumber company, is planning to remodel it into a foundry and machine shop.

The St. Louis Screw Co., St. Louis, advises that its recently noted incorporation was simply the renewal of an

expired charter, and that no other change is contemplated.

The Michigan Crank Shaft Co. is planning to remove its shops from Muskegon, Mich., to Lansing, where it will be located in one of the Seager Engine Works buildings on River street.

Moline Pressed Steel Co., Moline, Ill., has increased its capital stock from $25,000 to $50,000. The company has just completed an addition to its plant with equipment, doubling its capacity.

The Lycoming Foundry Co., South Williamsport, Pa., has received an order from the Velee Motor Truck Co. for 500 engines, this following the original contract made a year ago for 2,000 engines.

The F. J. Nice Furnace Co., Pontiac, Mich., has been incorporated with $25,000 capital stock, to manufacture a new furnace, designed for industries where a high degree of temperature is to be maintained for some time.

A special meeting of stockholders of the Allegheny Steel Co., with general offices at Pittsburg, and works at Brackenridge, Pa., has been called for July 6, to act on a proposed increase in the capital stock of from $3,000,000 to $3,500,000.

The Clark Motor Car Co., Buffalo, N. Y., manufacturer of electric vehicles, advises that, owing to the acquisition of sufficient manufacturing space, no building will be done for at least a year. The company is now able to produce two automobiles a day.

The Imperial Iron & Steel Co., Oklahoma City, Okla., has increased its capital stock from $80,000 to $100,000. The company, which was originally formed in Gainesville, Tex., after operating there a year decided to locate in Oklahoma City, which offered better facilities.

The plant of the Keystone Axle Co., Beaver Falls, Pa., has been purchased by Henry Braun & Co., Seventeenth street, Pittsburg. The plant, which was built some years ago for rolling car axles, will be dismantled and the equipment shipped to Pittsburg.

The Brinnis Mfg. Co. has been incorporated at Oxnard, Cal., for the purpose of operating a foundry in connection with the present machinery business of Louis Brinnis. Castings for bean and sugar harvesting machinery will be the principal product.

The George E. Dow Pumping Engine Co., of San Francisco, has closed a contract with the California Oil Fields Co., Ltd., for the installation of a large plant, including a complete oil firing set; two Parker water tube boilers of 140 horsepower each; pumps, etc.

The Missouri Iron Co., St. Louis, operating shops at Waukon, Ia., recently elected these officers and directors at its annual meeting: President, Edward F. Goltra; vice president, T. S. Maffitt; secretary and treasurer, J. D. Dana, who with P. C. Maffitt, constitute the board of directors.

Crown Die & Tool Co., 105-9 North Canal street, Chicago, has increased its capital stock, as recently noted, with the idea of increasing the business in all branches, especially adding to its line of tools to sell to the trade as well as enlarging its own machine and tool shop equipment.

The Electrical Machinery Co., Minneapolis, is the lowest bidder for furnishing and installing the electrical equipment in the new power plant at Stoughton, Wis. The bid was $2,280. Allis-Chalmers Co. bid $3,400 and the General Electric Co. $3,195. The award will be made by the committee on electric lighting.

The Maryland Steel Co., Sparrows Point, Md., has been awarded the contract to build a seagoing freight and passenger tug for the Spanish-American Iron Co., for use in the Carribean Sea and Gulf of Mexico. The vessel's dimensions will be: Length, 125 feet over all; length at waterline, 120 feet; beam (molded), 25 feet; depth of hold, 15 feet. She will be propelled by a triple-expansion engine at a normal cruising speed of 12 knots.

The Stephenson Motor Truck Co., of Milwaukee, Wis., has been incorporated with a capital of $300,000 by A. R. Haldeman, F. H. Friedrich and Paul D. Durant. Mr. Haldeman has been secretary and treasurer of the Stephenson Motor Car Co. of Milwaukee for several years. About eight months ago the company moved its plant to South Milwaukee, in order to gain more room and increase its facilities.

The Porceliron Co., Beaver Falls, O., has filed application for a charter with a capital of $25,000, and proposes to manufacture a general line of stoves and ranges, from a new product of cast iron and an additional material, the process being covered by patents now pending. The officers of the company will be: President, Earnest Richardson; vice president, Louis Ingram; secretary and treasurer, M. N. Hurd, all of Beaver Falls.

The S. J. Gardner Foundry & Machine Co., New Albany, Ind., has taken over the shops of S. J. Gardner. New buildings have been built and equipped as follows: Machine shop, 50 x 120 feet; sheet iron shop, 60 x 120 feet; foundry, 50 x 120 feet; the equipment including two cupolas and two 5-ton traveling cranes. The officers are: President, S. J. Gardner; vice president, M. C. Gardner; secretary and treasurer, Frank S. Sissloff.

John Westover, Inc., Lincoln, Neb., advises that it is now moving from its old into its new shop. The latter comprises a structural shop, 80 x 100 feet; foundry, 50 x 80 feet; blacksmith shop, 50 x 100 feet; office building, three stories, 20 x 34 feet; pattern shop; pattern storage shed; coke and sand sheds, paint house, coal house and stable. The foundry is equipped for turning out gray iron castings for general jobbing work. The structural shop has a capacity for handling work up to 20 tons. The plant is equipped with wash rooms, lockers and other modern conveniences for the workmen. The company at present has contracts for 300 tons of structural work and 200 tons of castings.

Vesta Gas Range & Mfg. Co., Chattanooga, Tenn., whose incorporation was recently noted, will manufacture gas ranges, steel ranges and cast cook stoves. It originally purchased the shops of the Chattanooga Stove Works, which it has enlarged and equipped thoroughly with modern machinery and patterns. Its buildings are brick, the ware and mounting room four stories, 60 x 280 feet, and foundry 65 x 220 feet. Its patterns are all aluminum match plates. C. C. Huntington, president of the Vesta company, has long experience in the stove industry and is acquainted with the needs of the trade in the south. The company is not in the market for further equipment.

Trade Note:—

The J. Faessler Mfg. Co., Moberly, Mo., maker of boss and universal fine expanders, flue cutters and other boiler tools, has reorganized its sales department and has placed Chas. F. Palmer in charge, as sales manager, with offices at 810 Olive street, St. Louis. Mr. Palmer is well qualified for this position through previous experience in selling Faessler tools and as representative of the Frank E. Palmer Supply Co., of St. Louis.

Fires:—

The Chicago plant of the Northwestern Can Co. was badly damaged by fire May 22, the loss being estimated at $50,000.

The plant of the Franke Steel Range Co., Cleveland, was damaged on May 15 by a fire which broke out in the japanning room. The loss is estimated at $10,000.